North/Latin America
Europe/Africa
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Internal Use Only

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LED LCD TV
SERVICE MANUAL

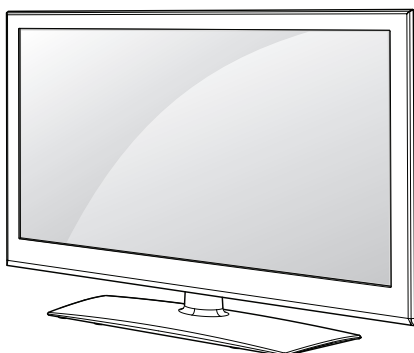**CHASSIS : LD12B**

MODEL : 32LV470S   32LV470S-ZC

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

### Do not use a line Isolation Transformer during this check.

Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit

AC Volt-meter

To Instrument's exposed METALLIC PARTS

Good Earth Ground such as WATER PIPE, CONDUIT etc.

0.15 uF

1.5 Kohm/10W
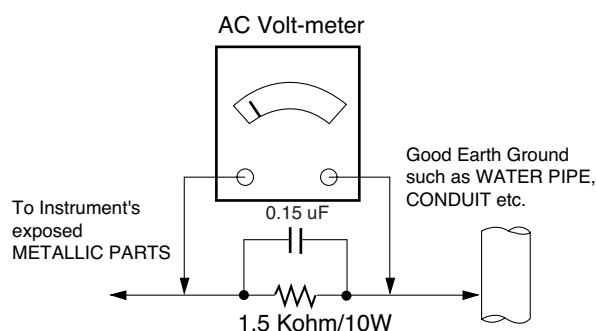
When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω

*Base on Adjustment standard

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LCD TV used LD12B chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature: 25 ℃ ± 5 ℃(77 ℉ ± 9 ℉), CST: 40 ℃ ± 5 ℃
2) Relative Humidity : 65 % ± 10 %
3) Power Voltage : Standard input voltage (AC 100-240 V~, 50 / 60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety : CE, IEC specification
   - EMC :CE, IEC

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	**DTV & Analog (Total 36 countries)** **DTV (MPEG2/4, DVB-T)** : 31 countries (England/Italy/Germany/France/Spain/Sweden/Finland/Netherlands/Belgium/Luxemburg/ Greece/Denmark/Czech/Austria /Hungary/Swiss/Croatia/Turkey/Norway/Slovenia/Poland/ Ukraine/Portugal/Ireland/Moroco/Latvia/Estonia/Lithania/Rumania/Russia/Slovakia) **DTV (MPEG2/4, DVB-T2)**: 5 countries (England/Sweden/Finland/Denmark/Norway) **DTV (MPEG2/4, DVB-C)**: 10 countries (Sweden/Finland/Denmark/Norway/Austria/Swiss/Germany/Netherlands/Hungary/Slovenia) **Analog Only** - 5 countries (Bosnia/Serbia/Bulgaria/Albania/Kazakhstan) **Supported satellite : 22 satellites** HISPASAT 1C/1D, ATLANTIC BIRD 2, NILESAT 101/102, ATLANTIC BIRD 3, AMOS 2/3, THOR 5/6, IRIUS 4, EUTELSAT-W3A, EUROBIRD 9A, EUTELSAT-W2A, HOTBIRD 6/8/9, EUTELSAT-SESAT, ASTRA 1L/H/M/KR, ASTRA 3A/3B, BADR 4/6, ASTRA 2D, EUROBIRD 3, EUTELSAT-W7, HELLASSAT 2, EXPRESS AM1, TURKSAT 2A/3A, INTERSAT10
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L' 5) DVB-T/C 6) DVB-T2 7) DVB-S	- DVB-T2/S is supported in specific models. 1. DVB-T2 : Model name : xxxxxxxT 2. DVB-S : Model name : xxxxxxxS - SECAM L/L' is not supported in DVB-T2 models.

No.	Item	Specification	Remarks
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM , QAM	**► DVB-T** - Guard Interval(Bitrate_Mbit/s) 1/4, 1/8, 1/16, 1/32 - Modulation : Code Rate QPSK : 1/2, 2/3, 3/4, 5/6, 7/8 16-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 64-QAM : 1/2, 2/3, 3/4, 5/6, 7/8 **► DVB-C** - Symbolrate : 4.0Msymbols/s to 7.2Msymbols/s - Modulation : 16QAM, 64-QAM, 128-QAM and 256-QAM **► DVB-T2** - Guard Interval(Bitrate_Mbit/s) 1/4,1/8,1/16,1/32,1/128,19/128,19/256, - Modulation : Code Rate QPSK : 1/2, 2/5, 2/3, 3/4, 5/6 16-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 64-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 256-QAM : 1/2, 2/5, 2/3, 3/4, 5/6 **► DVB-S** - Symbolrate DVB-S2 (8PSK / QPSK) : 2 ~ 45Msymbol/s DVB-S (QPSK) : 2 ~ 45Msymbol/s - viterbi DVB-S mode : 1/2, 2/3, 3/4, 5/6, 7/8 DVB-S2 mode : 1/2, 2/3, 3/4, 3/5, 4/5, 5/6, 8/9, 9/10
4	Scart Jack (1EA)	PAL, SECAM	Scart Jack is Full scart and support RF-OUT(analog & DTV) Not support DTV Auto AV.
5	Video Input RCA(1EA)	PAL, SECAM, NTSC	4System : PAL, SECAM, NTSC, PAL60
6	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	
7	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
8	HDMI Input (3EA)	HDMI1-DTV (DVI) HDMI2-DTV HDMI3-DTV	PC(HDMI version 1.3) Support HDCP
9	Audio Input (3EA)	RGB/DVI Audio, Component, AV	L/R Input
10	SDPIF out (1EA)	SPDIF out	
11	Earphone out (1EA)	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, USB	
12	USB (1EA)	EMF For Service (download) DivX HD	JPEG, MP3

5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	HDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

6. RGB Input (PC)

No.	Specification				Proposed	Remarks
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1360*768	47.72	59.8	84.75	WXGA	
6.	1920*1080	66.587	59.93	138.625	WUXGA	FHD model

7. HDMI Input

(1) DTV Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*480	31.469 / 31.5	59.94 / 60	27.00 / 27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96 / 45	59.94 / 60	74.17 / 74.25	HDTV 720P	
5.	1920*1080	33.72 / 33.75	59.94 / 60	74.17 / 74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97 / 27	23.97 / 24	74.17 / 74.25	HDTV 1080P	
8.	1920*1080	33.716 / 33.75	29.976 / 30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43 / 67.5	59.94 / 60	148.35 / 148.50	HDTV 1080P	

(2) PC Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3.	800*600	37.879	60.31	40.00	VESA	HDCP
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5.	1360*768	47.72	59.8	84.75	WXGA	HDCP
6.	1280*1024	63.595	60.0	108.875	SXGA	HDCP/FHD model
7.	1920*1080	67.5	60.00	138.625	WUXGA	HDCP/FHD model

ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LCD TV with LD12B chassis.

2. Designation

(1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test instrument.

(2) Adjustment must be done in the correct order.

(3) The adjustment must be performed in the circumstance of 25 ℃ ± 5 ℃ of temperature and 65 % ± 10 % of relative humidity if there is no specific designation.

(4) The input voltage of the receiver must keep AC 100-240 V~, 50 / 60Hz.

(5) The receiver must be operated for about 5 minutes prior to the adjustment when module is in the circumstance of over 15.

In case of keeping module is in the circumstance of 0 ℃, it should be placed in the circumstance of above 15 ℃ for 2 hours

In case of keeping module is in the circumstance of below -20 ℃, it should be placed in the circumstance of above 15 ℃ for 3 hours.

[Caution]
When still image is displayed for a period of 20 minutes or longer (especially where W/B scale is strong. Digital pattern 13ch and/or Cross hatch pattern 09ch), there can some afterimage in the black level area.

3. Automatic Adjustment

3.1. MAC Address

(1) Equipment & Condition
- Play file: Serial.exe
- MAC Address edit
- Input Start / End MAC address

(2) Download method
1) Communication Prot connection

PCBA — PC(RS-232C)
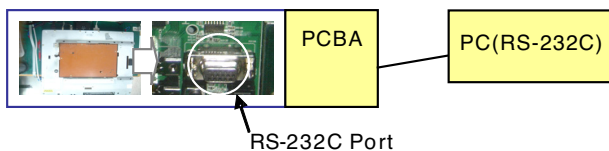
RS-232C Port

Connect: PCBA Jig-> RS-232C Port== PC-> RS-232C Port

2) MAC Address & CI+ key Download
- Set CI+ key path Directory at start Mac & CI Download Program
- Com 1,2,3,4 and 115200(Baud rate)
- Port connection button click(1)
- Push the (2) MAC Address write.
- At success Download, check the OK(3).
- Start CI+ Download, Push the (4).
- Check the OK or NG.(5)
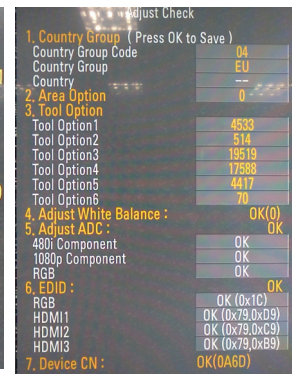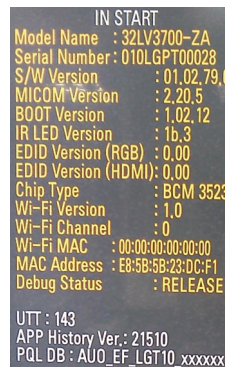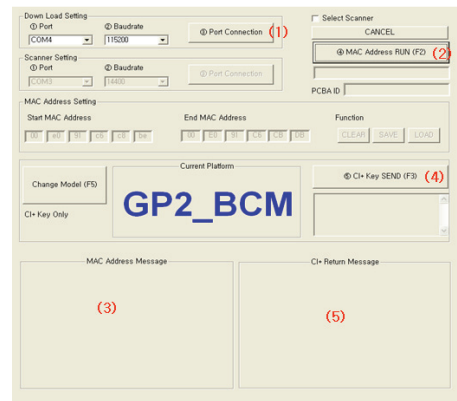
3.2. LAN

(1) Equipment & Condition
■ Each other connection to LAN Port of IP Hub and Jig
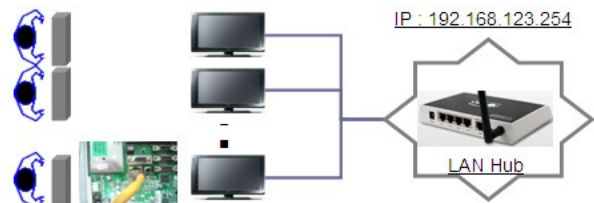
(2) LAN inspection solution
■ LAN Port connection with PCB
■ Network setting at MENU Mode of TV
■ setting automatic IP
■ Setting state confirmation
-> If automatic setting is finished, you confirm IP and MAC Address.
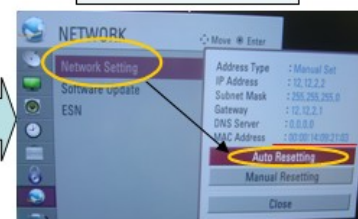
3.3. LAN PORT INSPECTION(PING TEST)

Connect SET -> LAN port == PC -> LAN Port.

```
SET ———— PC
```

(1) Equipment setting
  1) Play the LAN Port Test PROGRAM.
  2) Input IP set up for an inspection to Test Program.
    *IP Number : 12.12.2.2
(2) LAN PORT inspection (PING TEST)
  1) Play the LAN Port Test Program.
  2) Connect each other LAN Port Jack.
  3) Play Test (F9) button and confirm OK Message.
  4) Remove LAN CABLE.

3.4. Model name & serial number download

(1) Model name & Serial number D/L
  ■ Press "Power on" key of service remote control.
    (Baud rate : 115200 bps)
  ■ Connect RS232 Signal Cable to RS-232 Jack.
  ■ Write Serial number by use RS-232.
  ■ Must check the serial number at Instart menu.

(2) Method & notice
  A. Serial number D/L is using of scan equipment.
  B. Setting of scan equipment operated by Manufacturing Technology Group.
  C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)
  If the TV set is downloaded by OTA or service man, sometimes model name or serial number is initialized.(Not always)
  There is impossible to download by bar code scan, so It need Manual download.
  a. Press the 'instart' key of ADJ remote control.
  b. Go to the menu '5.Model Number D/L' like below photo.
  c. Input the Factory model name(ex 42LD450-ZA) or Serial number like photo.

d. Check the model name Instart menu. -> Factory name displayed. (ex 32LV3700-ZA)
e. Check the Diagnostics.(DTV country only) -> Buyer model displayed. (ex 32LV3700)

4. Manual Adjustment

4.1. EDID(The Extended Display Identification Data)/DDC(Display Data Channel) download

(1) Overview
  It is a VESA regulation. A PC or a MNT will display an optimal resolution through information sharing without any necessity of user input. It is a realization of "Plug and Play".

(2) Equipment
  - Adjustment remote control
  - Since embedded EDID data is used, EDID download JIG, HDMI cable and D-sub cable are not need.

(3)Download method
  1) Press ADJ key on the Adjustment remote control, then select "12.EDID D/L", by pressing Enter key, enter EDID D/L menu.
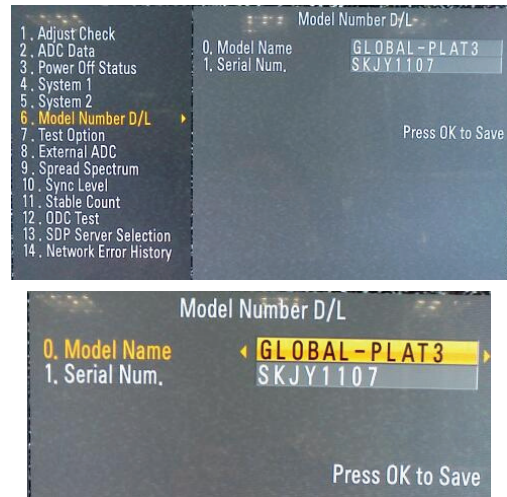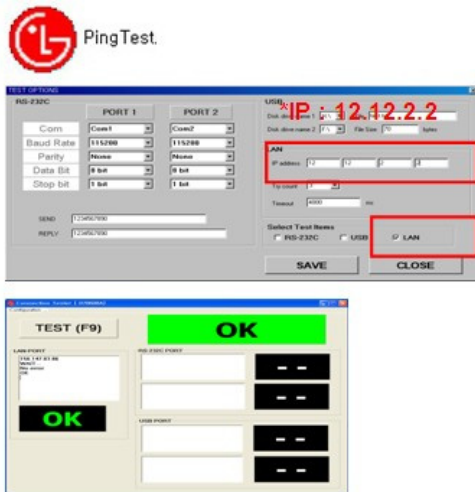 2) Select [Start] button by pressing Enter key, HDMI1/ HDMI2/ HDMI3/ RGB are Writing and display OK or NG.

(4) EDID DATA
  ■ HDMI

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01			01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
0x02	0F	50	54	A1	08	00	71	40	81	C0	81	00	81	80	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	39
0x06	3F	1F	52	10	00	0A	20	20	20	20	20	20				
0x07															01	1
0x00	02	03	26	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
0x01	22	15	01	26	15	07	50	09	57	07	67					
0x02			E3	05	03	01	01	1D	80	18	71	1C	16	20	58	2C
0x03	25	00	A0	5A	00	00	00	9E	01	1D	00	80	51	D0	1A	20
0x04	6E	88	55	00	A0	5A	00	00		1A	02	3A	80	18	71	38
0x05	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	66	21	50	B0
0x06	51	00	1B	30	40	70	36	00	A0	5A	00	00	00	1E	00	00
0x07	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	2

■ RGB

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00	00	FF	FF	FF	FF	FF	FF	00	1E	6D						
0x01		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26	
0x02	0F	50	54	A1	08	00	71	4F	01	01	01	01	01	01	95	00
0x03	90	40	A9	C0	B3	00	02	3A	80	18	71	38	2D	40	58	2C
0x04	45	00	A0	5A	00	00	00	1E	66	21	50	B0	51	00	1B	30
0x05	40	70	36	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
0x06	3E	1E	53	10	00	0A	20	20	20	20	20	20				
0x07															01	3

■ Reference
- HDMI1 ~ HDMI3 / RGB
- In the data of EDID, bellows may be different by S/W or Input mode.

Product ID

Model Name	HEX	EDID Table	DDC Function
ALL	0001	0100	Analog
	0001	0100	Digital

Serial No. : Controlled on product line

Month, Year: Controlled on production line:
ex) Monthly : '01' -> '01'
    Year : '2010' -> '14'

Model Name(Hex):

MODEL	MODEL NAME(HEX)
all	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20 20

Checksum: Changeable by total EDID data.

INPUT	1	2	3
HDMI1	7F	D9	X
HDMI2	7F	C9	X
HDMI3	7F	B9	X
RGB	X	X	98

Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	67 03 0C 00 10 00 B8 2D
HDMI2	67 03 0C 00 20 00 B8 2D
HDMI3	67 03 0C 00 30 00 B8 2D
RGB	67 03 0C 00 40 00 B8 2D

4.2. White Balance Adjustment

4.2.1. Overview

(1) W/B adj. Objective & How-it-works
(2) Objective: To reduce each Panel's W/B deviation
(3) How-it-works : When R/G/B gain in the OSD is at 192, it means the panel is at its Full Dynamic Range. In order to prevent saturation of Full Dynamic range and data, one of R/G/B is fixed at 192, and the other two is lowered to find the desired value.
(4) Adj. condition : normal temperature
  1) Surrounding Temperature : 25 ℃ ± 5 ℃
  2) Warm-up time: About 5 Min
  3) Surrounding Humidity : 20 % ~ 80 %

4.2.2 Equipment

1) Color Analyzer: CA-210 (LED Module : CH 14)
2) Adj. Computer(During auto adj., RS-232C protocol is needed)
3) Adjustment remote control
4) Video Signal Generator MSPG-925F 720p/204-Gray (Model:217, Pattern:49)
   -> Only when internal pattern is not available

■ Color Analyzer Matrix should be calibrated using CS-1000.

4.2.3. Equipment connection MAP

* If TV internal pattern is used, not needed
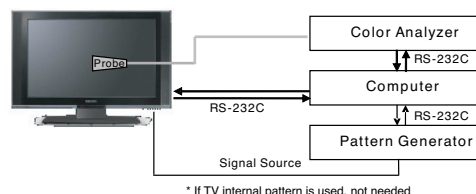
4.2.4. Adj. Command (Protocol)

START 6E A 50 A LEN A 03 A CMD A 00 A VAL A CS A STOP

<Command Format>
- LEN: Number of Data Byte to be sent
- CMD: Command
- VAL: FOS Data value
- CS: Checksum of sent data
- A: Acknowledge
Ex) [Send: JA_00_DD] / [Ack: A_00_okDDX]

■ RS-232C Command used during auto-adj.

RS-232C COMMAND			Explanation
[CMD	ID	DATA]	
wb	00	00	Begin White Balance adj.
wb	00	10	Gain adj.(internal white pattern)
wb	00	1f	Gain adj. completed
wb	00	20	Offset adj.(internal white pattern)
wb	00	2f	Offset adj. completed
wb	00	ff	End White Balance adj.(Internal pattern disappears)

Ex) wb 00 00 -> Begin white balance auto-adj.
     wb 00 10 -> Gain adj.
     ja 00 ff -> Adj. data
     jb 00 c0
     ...
     ...
     wb 00 1f -> Gain adj. completed
  *(wb 00 20(Start), wb 00 2f(completed)) -> Off-set adj.
     wb 00 ff -> End white balance auto-adj.

■ Adj. Map

	ITEM	Command		Data Range(Hex.)		Default(Decimal)
		Cmd 1	Cmd 2	Min	Max	
Cool	R-Gain	j	g	00	C0	
	G-Gain	j	h	00	C0	
	B-Gain	j	i	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Medium	R-Gain	j	a	00	C0	
	G-Gain	j	b	00	C0	
	B-Gain	j	c	00	C0	
	R-Cut					
	G-Cut					
	B-Cut					
Warm	R-Gain	j	d	00	C0	
	G-Gain	j	e	00	C0	
	B-Gain	j	f	00	C0	
	R-Cut					
	G-Cut					

■ 3 Command White Balance Adj. Map

	Command (lower case ASCII)		SetID	R Gain(HEX)		G Gain(HEX)		B Gain(HEX)	
	CMD1	CMD2		MIN	MAX	MIN	MAX	MIN	MAX
Cool	j	j	00	00	C0	00	C0	00	C0
Medium	j	k	00	00	C0	00	C0	00	C0
Warm	j	l	00	00	C0	00	C0	00	C0

■ Infrared Sensor Adj. Map

	Command (lower case ASCII)		R Gain(HEX)		G Gain(HEX)		B Gain(HEX)	
	CMD1	CMD2	MIN	MAX	MIN	MAX	MIN	MAX
Cool	1	C	00	C0	00	C0	00	C0
Medium	1	D	00	C0	00	C0	00	C0
Warm	1	E	00	C0	00	C0	00	C0

4.2.5. Adj. method

(1) Auto adj. method
   1) Set TV in adj. mode using POWER ON key.
   2) Zero calibrate probe then place it on the center of the Display.
   3) Connect Cable (RS-232C)
   4) Select mode in adj. Program and begin adjustment.
   5) When adj. is completed(OK Sign), check adj. status pre mode. (Warm, Medium, Cool)
   6) Remove probe and RS-232C cable to complete adj..

■ W/B Adj. must begin as start command "wb 00 00" , and finish as end command "wb 00 ff", and Adj. offset if need.

(2) Manual adj. method
   1) Set TV in Adj. mode using POWER ON.
   2) Zero Calibrate the probe of Color Analyzer, then place it on the center of LCD module within 10cm of the surface.
   3) Press ADJ key -> EZ adjust using adjustment remote control -> 9.White-Balance then press the cursor to the right key (►).(When key(►) is pressed 216 Gray internal pattern will be displayed.)
   4) One of R Gain / G Gain / B Gain should be fixed at 192, and the rest will be lowered to meet the desired value.
   5) Adjustment is performed in COOL, MEDIUM, WARM 3 modes of color temperature.

■ If internal pattern is not available, use RF input. In EZ Adj. menu 9.White Balance, you can select one of 2 Test -pattern: ON, OFF. Default is inner(ON). By selecting OFF, you can adjust using RF signal in 216 gray pattern.

■ Adj. condition and cautionary items
   1) Lighting condition in surrounding area
      Surrounding lighting should be lower 10 lux. Try to isolate adj. area into dark surrounding.
   2) Probe location
      : Color Analyzer(CA-210) probe should be within 10 cm and perpendicular of the module surface.(80°~100°)
   3) Aging time
      - After Aging Start, Keep the Power ON status during 5 Minutes.
      - In case of LCD, Back-light on should be checked using no signal or Full-white pattern.

4.2.6. Reference (White Balance Adj. coordinate and temperature)

■ Luminance : 204 Gray
■ Standard color coordinate and temperature using CS-1000 (over 26 inch)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269	0.273	13000 K	0.0000
MEDIUM	0.285	0.293	9300 K	0.0000
WARM	0.313	0.329	6500 K	0.0000

■ Standard color coordinate and temperature using CA-210 (CH 14)

Mode	Color Coordination		Temp	ΔUV
	x	y		
COOL	0.269 ± 0.002	0.273 ± 0.002	13000 K	0.0000
MEDIUM	0.285 ± 0.002	0.293 ± 0.002	9300 K	0.0000
WARM	0.313 ± 0.002	0.329 ± 0.002	6500 K	0.0000

4.3. EYE-Q function check

Step 1) Turn on TV.

Step 2) Press EYE key of Adjustment remote control.

Step 3) Cover the Eye Q II sensor on the front of the using your hand and wait for 6 seconds.

Step 4) Confirm that R/G/B value is lower than 10 of the "Raw Data (Sensor data, Back light)". If after 6 seconds, R/G/B value is not lower than 10, replace Eye Q II sensor.

Step 5) Remove your hand from the Eye Q II sensor and wait for 6 seconds.

Step 6) Confirm that "ok" pop up. If change is not seen, replace Eye Q II sensor.

4.4. Option selection per country

(1) Overview
- Option selection is only done for models in Non-EU.
- Applied model: LD12B Chassis applied EU model.

(2) Method
1) Press ADJ key on the Adj. Remote Control, then select Country Group Menu.
2) Depending on destination, select Country Group Code 04 or Country Group EU then on the lower Country option, select US, CA, MX. Selection is done using +, - or ►◄ key.

5. Tool Option selection

- Method : Press ADJ key on the Adjustment remote control, then select Tool option.

6. Ship-out mode check(In-stop)

After final inspection, press IN-STOP key of the Adjustment remote control and check that the unit goes to Stand-by mode.

7. GND and Internal Pressure check

7.1. Method

1) GND & Internal Pressure auto-check preparation
- Check that Power Cord is fully inserted to the SET. (If loose, re-insert)

2) Perform GND & Internal Pressure auto-check
- Unit fully inserted Power cord, Antenna cable and A/V arrive to the auto-check process.
- Connect D-terminal to AV JACK TESTER.
- Auto CONTROLLER(GWS103-4) ON
- Perform GND TEST.
- If NG, Buzzer will sound to inform the operator.
- If OK, changeover to I/P check automatically. (Remove CORD, A/V form AV JACK BOX.)
- Perform I/P test.
- If NG, Buzzer will sound to inform the operator.
- If OK, Good lamp will lit up and the stopper will allow the pallet to move on to next process.

7.2. Checkpoint

・TEST voltage
  - GND: 1.5 KV/min at 100 mA
  - SIGNAL: 3 KV/min at 100 mA
・TEST time: 1 second
・TEST POINT
  - GND TEST = POWER CORD GND & SIGNAL CABLE METAL GND
  - Internal Pressure TEST = POWER CORD GND & LIVE & NEUTRAL
・LEAKAGE CURRENT: At 0.5 mArms

8. USB S/W download(option, service only)

1) Put the USB Stick to the USB socket.
2) Automatically detecting update file in USB Stick
   - If your downloaded program version in USB Stick is Low, it didn't work. But your downloaded version is High, USB data is automatically detecting.
3) Show the message "Copying files from memory".
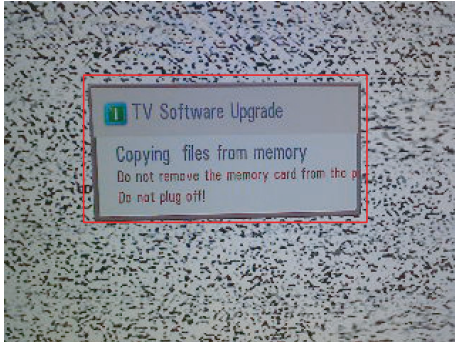
4) Updating is starting.
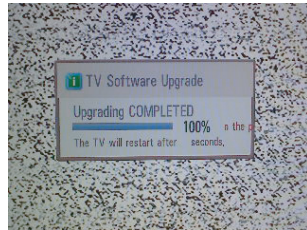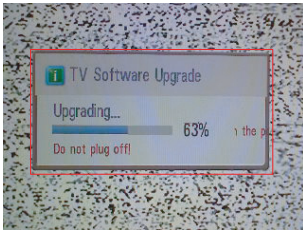
5) Updating Completed, the TV will restart automatically.
6) If your TV is turned on, check your updated version and Tool option. (explain the Tool option, next stage)
   * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

* After downloading, have to adjust TOOL OPTION again.
  1) Push "IN-START" key in service remote control.
  2) Select "Tool Option 1" and Push "OK" key.
  3) Punch in the number. (Each model has their number.)

BLOCK DIAGRAM

EXPLODED VIEW

NAND FLASH MEMORY 8Gbit

IC102
TC58DVG4S0ETA00
NAND_8Gbit

NAND_DATA[0-7]

16Gbit

IC102-*1
TH58DVG4S0ETA20
DEV_NAND_16Gbit

Boot ROM Device Select - (FA4,FAD7,FAD2,FAD1)

0000: ST Micro M25P or compatible Serial Flash
0010: 8-bit 512MBit 512B page SLC NAND Flash devices
0100: 8-bit 128 , 256Mbit 512B page SLC NAND Flash devices
0110: 8-bit 1Gbit 2KB page SLC NAND Flash devices
1000: 8-bit 2Gbit, 4Gbit, 8Gbit 2KB page SLC NAND Flash devices
1010: 8-bit 16Gbit, 32Gbit 4KB page MLC NAND Flash devices (O)
0001: 8-bit 8/16/32Gbit 2KB page MLC NAND Flash devices
0011: 8-bit 16/32Gbit 4KB page MLC NAND Flash devices
0101: 8-bit 32Gbit 8KB page MLC NAND Flash devices
0111: 3B dual IO Serial Flash
1001: 3B dual IO Serial Flash
1011: fast Serial Flash > 50Mhz
1100: OneNAND Flash (always 16-bit)
1110: Reserved
1101, 1111: Reserved

NAND ECC (FA3, FA2, FALE)

000 = ECC disabled
001 = ECC 1-bit repair
010 = ECC 4-bit BCH (O)
011 = ECC 8-bit BCH, 27 byts spare
100 = ECC 12-bit BCH, 27 byte spare
101 = ECC 8-bit BCH, 16 byte spare
110 , 111 = Reserved

Strap Setting

NAND_DATA[0]
CI_ADDR[9]
CI_ADDR[7]
NAND_DATA[6]
NAND_CLE
NAND_DATA[4]
CI_ADDR[9]
CI_ADDR[11]
CI_ADDR[13]
CI_ADDR[8]
NAND_DATA[3]
NAND_DATA[5]

NAND_DATA[0]:
0) System is LITTLE endian (O)
1) System is BIG endian
TVM Crystal oscillator bias/gain control
0000: 210uA
0001: 390uA
0010: 570uA
0011: 730uA
0100: 890uA (O)
0111: 1290uA
1000: 1416uA
1111: 2196uA
0101, 0110, 1001, 1010, 1011, 1100, 1101, 1110: Reserved

CI_ADDR[7]:
0) Disable EDID automatic Downloading from Flash (O)
1) Enable EDID automatic Downloading from Flash

NAND_DATA[6]:
0) Disable OSC clock output on chip Pin (O)
1) Enable OSC clock output on chip pin.

CI_ADDR[6]:
0) Host MIPS run at 500 MHz (O)
1) Host MIPS run at 250 MHz

CI_ADDR[8]:
0) RESETOUTb (in On/Off only) stay asserted until software releases them.
1) Fix amount of delay for de-assertion on RESETOUTb (in On/Off only) at end of RESETb pulse

NAND_CLE:
0) Differential Oscillators TVM not bypassed (O)
1) Differential Oscillators TVM bypassed

NAND_DATA[3]:
0) MIPS will boot from external flash (O)
1) MIPS will boot from ROM

NAND_DATA[4]:
0) 27MHz TVM Crystal Frequency (O)
1) 54MHz TVM Crystal Frequency (O)

NAND_DATA[5]:
0) FLASH MODE (O)
1) BSC_SLAVE(BES) MODE

DUAL COMPONENT

IC102	1ST : EAN61000101 2ND : T-TH58DVG4S0ETA20
IC102-*1	

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

NAND_DATA[0-7]

NVRAM

IC103-*1
AT24C256C-SSHL-T

IC103
M24M01-HRMN6TP
A8'h

Write Protection
- Low : Normal Operation
- High : Write Protection

54MHz X-TAL

X101-*2
54MHz
CRYSTAL_BCM_KDS
EAN58239604
DAISHINKU CORPORATION.

X101-*1
54MHz
CRYSTAL_BCM_Lihom
EAN60763703
LIHOM CO., LTD.

X101
54MHz
CRYSTAL_BCM_Sunny
EAN58812611
SUNNY ELECTRONICS CORPORATION

BBS CONNECT

P101
TJC2508-4A
1 VCC
2 SCL
3 SDA
4 GND

DVB_S Option! apply EU Satellite model

FOR HDMI STANDARD
APPLY ONLY WHEN CONNECT TO PULL-UP GPIO

BCM REFERENCE is 562ohm

Write Protection
- High : Normal Operation
- Low : Write Protection

SECRET
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LG ELECTRONICS

MODEL	BCM35230	DATE	2010.09.18
BLOCK	MAIN & NAND FLASH	SHEET	1

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN POWER	SHEET	2 / 50

POWER 2.5V

CORE 0.9V

POWER 3.3V

MODEL OPTION

	NO_FRC	BCM internal FRC	LG FRC2	external UHSA5
MODEL_OPT_0	0	0	1	1
MODEL_OPT_1	0	1	0	1

		HIGH	LOW
MODEL_OPT_2		FHD	HD
MODEL_OPT_3		OLED	LCD
MODEL_OPT_4	DDR speed	1333	1600
MODEL_OPT_5	T2 Tuner	Support	Not Support
MODEL_OPT_6	S Tuner	Support	Not Support
MODEL_OPT_7	PWM	Enable	Disable

IC101
LGE35230(BCM35230KFSBG)
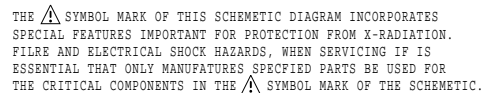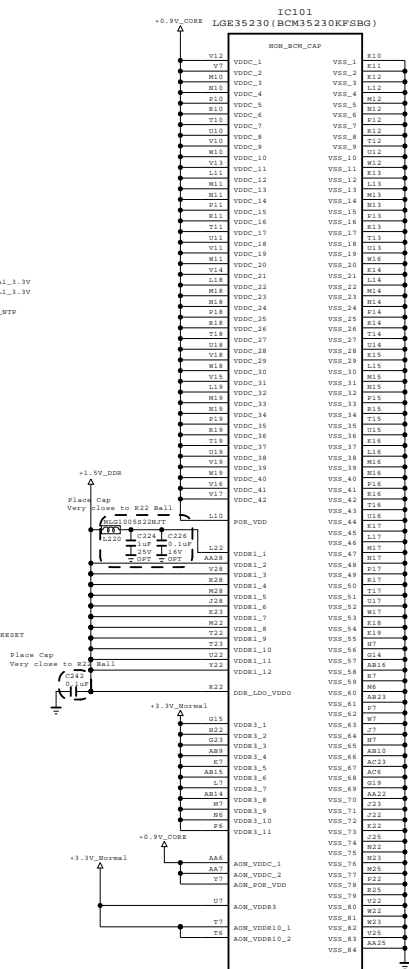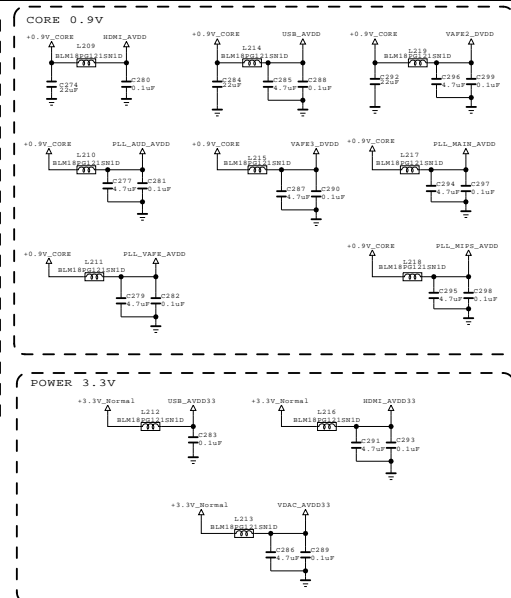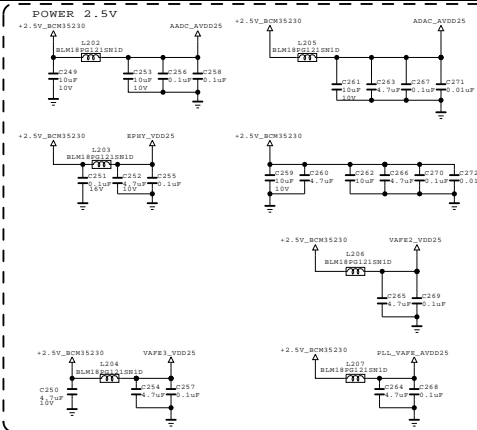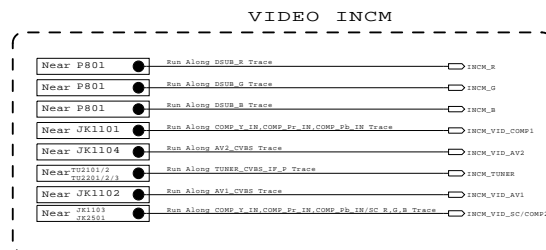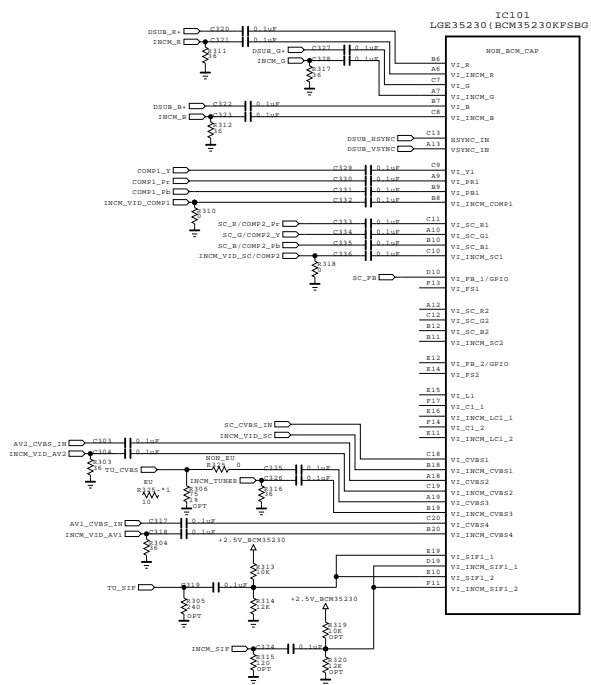
BCM35230_with_CAP_220pF

IC101-*1
LGE35230
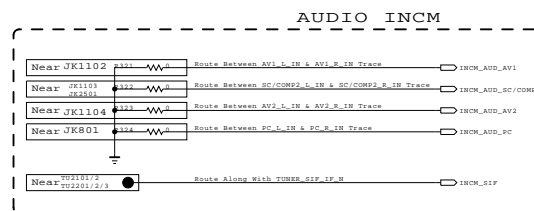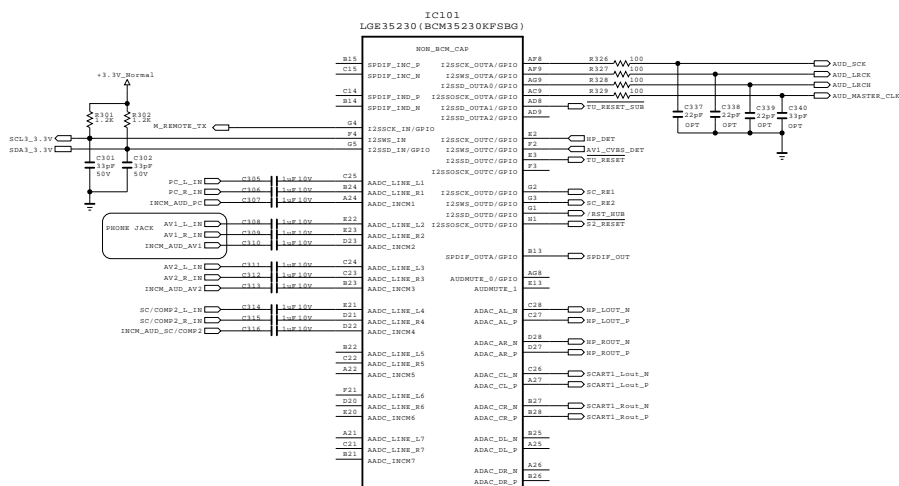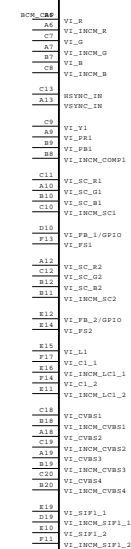
VIDEO INCM

Near P801	Run Along DSUB_R Trace	INCM_R
Near P801	Run Along DSUB_G Trace	INCM_G
Near P801	Run Along DSUB_B Trace	INCM_B
Near JK1101	Run Along COMP_Y_IN,COMP_Pr_IN,COMP_Pb_IN Trace	INCM_VID_COMP1
Near JK1104	Run Along AV2_CVBS Trace	INCM_VID_AV2
Near TU2101/2 TU2201/2/3	Run Along TUNER_CVBS_IF_P Trace	INCM_TUNER
Near JK1102	Run Along AV1_CVBS Trace	INCM_VID_AV1
Near JK1103 JK2501	Run Along COMP_Y_IN,COMP_Pr_IN,COMP_Pb_IN/SC R,G,B Trace	INCM_VID_SC/COMP2

AUDIO INCM

Near JK1102	Route Between AV1_L_IN & AV1_R_IN Trace	INCM_AUD_AV1
Near JK1103 JK2501	Route Between SC/COMP2_L_IN & SC/COMP2_R_IN Trace	INCM_AUD_SC/COMP2
Near JK1104	Route Between AV2_L_IN & AV2_R_IN Trace	INCM_AUD_AV2
Near JK801	Route Between PC_L_IN & PC_R_IN Trace	INCM_AUD_PC
Near TU2101/2 TU2201/2/3	Route Along With TUNER_SIF_IF_N	INCM_SIF

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

IC101
LGE35230(BCM35230KFSBG)
NON_BCM_CAP

SECRET
LGElectronics

LG ELECTRONICS

| MODEL | BCM35230 | DATE | |
| BLOCK | MAIN AUDIO/VIDEO | SHEET | 3 / 50 |

DDR STRAP

DUAL COMPONENT	
IC401,IC402	1ST : EAN61667501, 2ND : EAN61570701
IC401-*1 IC402-*1	1ST : T-K4B2G1646B_HCK0, 2ND : T-H5TQ2G63BFR-PBC
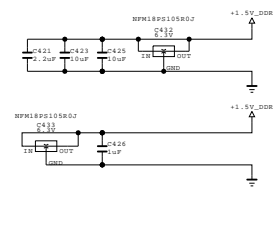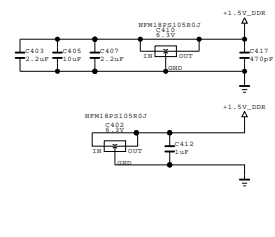
DDR_DQ[0]
DDR_DQ[1]
DDR_DQ[2]
DDR_DQ[3]
DDR_DQ[4]

JEDEC Types (DDR_DQ[0:4])
00001 : DDR3-1333N (CasL=9)
10101 : DDR3-1600K (CasL=11) (O)

DDR_DQ[10]
DDR_DQ[9]
DDR_DQ[7]
DDR_DQ[8]
DDR_DQ[6]
DDR_DQ[5]

Bus Width (DDR_DQ[10])
0 - 16b
1 - 32b (O)
Chip Width (DDR_DQ[8])
0 - 8b
1 - 16b (O)
Chip Size (DDR_DQ[6:5])
00 - 4Gbit
01 - 2Gbit (O)
10 - 1Gbit
11 - 512Mbit

IC101
LGE35230(BCM35230KFSBG)

IC401
K4B2G1646C

IC402
K4B2G1646C

+1.5V_DDR

NFM18PS105R0J

SECRET
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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	MAIN DDR	SHEET	4 / 50

FROM LIPS & POWER B/D

#16/#20/#23
LD - GND OR USE
LE(N.L.D.) - OPEN
LE(L.D.) - USE

Power_DET

15V-->3.6V
20V-->3.5V
24V-->3.48V
12V-->3.58V
ST_3.5V-->3.5V

not to RESET at 8kV ESD

+0.9V_CORE_BCM35230

Placed on SMD-TOP

Max 7350 mA

Vout=0.591*(1+R1/R2) Switching freq: 600K

DUAL COMPONENT

	1ST	2ND	3RD
Q501,Q504, Q505,Q506	0TRIY80001A	0TR387500AA	
Q502	0TRIH80004A	EBK61012501	0TR102009AM
Q507	EBK60752501	EBK61011501	
IC502,IC503	EAN61151001	EAN60670101	

OS Module OPT

<OS MODULE PIN MAP>

PIN No	LGD	CMO(09)	AUO	SHARP
18	INV_ON	A-DIM	INV_ON	INV_ON
20	V4:VBR-A V5:NC	NC	Err_out	Err_out
22	PWM_DIM	PWM_DIM	A-DIM	PWM_DIM
24	Err_out LED:GND	INV_ON	PWM_DIM	GND

CHECK PWR/MODULE PIN MAP

+3.3V_NORMAL

Vout=0.8*(1+R1/R2)

MAX 2.8A

Vout=0.8*(1+R1/R2)   Switching freq: 500K

+2.5V_BCM35230

Max 960 mA

Vout=0.6*(1+R1/R2)

PANEL_POWER

TYP 1450mA

+1.5V_DDR

Max 800mA

IC508
AP7173-SPG-13 HF(DIODES)

1.5A

Vout=0.8*(1+R1/R2)

+5V_Normal

MAX 1A

IC507
AOZ1073AIL-3

3A

Placed on SMD-TOP

Vout=0.8*(1+R1/R2)   Switching freq: 500K

+5V_USB+WIFI

MAX 1.9A

IC506
AOZ1073AIL-3

3A

Placed on SMD-TOP

Vout=0.8*(1+R1/R2)   Switching freq: 500K

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.

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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	POWER	SHEET	5 / 58

For Debug

OPT
P401

+3.5V_ST

MICOM_RESET
R615 OPT 22   NEC_ISP_Tx
R617 OPT 22   NEC_ISP_Rx
OCD1A
OCD1B
R621 OPT 22   FLMD0
R608 10K

R607 10K   NEC_ISP_Rx
R610 10K   NEC_ISP_Tx

EEPROM for Micom

+3.5V_ST

IC601
M24C16-WMN6T

NC/E0 1   8 VCC
NC/E1 2   7 WC
NC/E2 3   6 SCL   R619 22   EEPROM_SCL
VSS   4   5 SDA   R616 22   EEPROM_SDA

R601

MICOM MODEL OPTION

+3.5V_ST

AMP_RESET_N R604 100   MODEL1_OPT_0
PANEL_CTL   R605 100   MODEL1_OPT_1
INSTANT_MODE R602 100   MODEL1_OPT_2
             R603 100   MODEL1_OPT_3

MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	10YEAR_TOOL (10 SENSOR)	11YEAR_TOOL (11 SENSOR)
MODEL_OPT_1	11	I2C_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	PDP/3D	LCD/OLED

	LCD	PDP	OLED	3D
MODEL_OPT_3	0	1	0	1

	LOW	LOW_SMALL	TBD	HIGH
MODEL_OPT_1	0	0	1	1
MODEL_OPT_2	0	1	0	1

10Mhz Crystal

GND
C602 50V 13pF
C603 50V 13pF
X601 10MHz

+3.5V_ST
R641 0   MICOM_DOWNLOAD
R637 10K

IC602
uPD78F0514
NEC_MICOM

VDD 48
VSS 47
REGC 46
P121/X1/OCD0A 45
P122/X2/EXCLK/OCD0B 44
FLMD0 43
P123/XT1 42
P124/XT2/EXCLKS 41
RESET 40
P40 39
P41 38
P120/INTP0/EXLVI 37

P60/SCL0 1   R629 22   SCL2_3.3V
P61/SDA0 2   R630 22   SDA2_3.3V
P62/EXSCL0 3   EEPROM_SCL
P63 4   EEPROM_SDA
P33/TI51/TO51/INTP4 5 R631 22   HDMI_CEC
P75 6   POWER_ON/OFF2_1
P74 7   AMP_MUTE
P73/KR3 8   MODEL1_OPT_0
P72/KR2 9   R632 22   SOC_RESET
P71/KR1 10   INV_CTL
P70/KR0 11   MODEL1_OPT_1
P32/INTP3/OCD1B 12 R633 22 OCD1B
                    S/T_SCL R627 4.7K

P140/PCL/INTP6 36   KL_ON
P00/TI000 35   SCART_MUTE
P01/TI010/TO00 34   EDID_WP
P130 33
P20/ANI0 32
ANI1/P21 31   MODEL1_OPT_3
ANI2/P22 30   MODEL1_OPT_2
ANI3/P23 29   POWER_ON/OFF1
ANI4/P24 28   MICOM_DOWNLOAD
ANI5/P25 27   SIDE_HP_MUTE
ANI6/P26 26   KEY2
ANI7/P27 25   KEY1

13 14 15 16 17 18 19 20 21 22 23 24

P31/INTP2/OCD1A
P30/INTP1
P17/TI50/TO50
P16/TOH1/INTP5
P15/TOH0
P14/RXD6
P13/TXD6
P12/SO10
P11/SI10/RXD0
P10/SCK10/TXD0
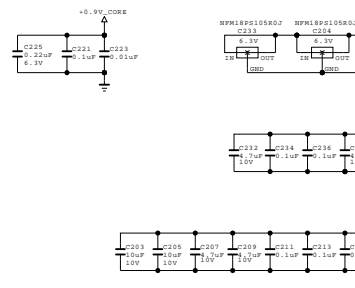AVREF
AVSS

R604 0.1uF
C604 0.1uF

+3.5V_ST
R636 4.7K   R638 22   R640 10K

Q601 2SC3052

SECRET
LGElectronics

LG ELECTRONICS

MODEL BCM35230   DATE
BLOCK MICOM   SHEET 6 / 50

[Local Dimming Block]

P1601
12507WR-08L

Pin	Signal
1	
2	
3	L/DIM0_SCLK
4	
5	L/DIM0_MOSI
6	R1601 33 LPB_42/47/55 — SCL2_3.3V
7	R1602 33 LPB_42/47/55 — SDA2_3.3V
8	L/DIM0_VS
9	

SECRET
LGElectronics

🅛 LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	L_DIMMING	SHEET	16 / 50

DUAL COMPONENT

Q1901	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q1902	1ST : EBK60752501, 2ND : EBK61011501
IC1904	1ST : 0ISTLPH062A, 2ND : EAN40055001
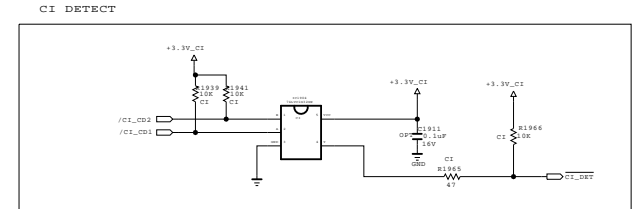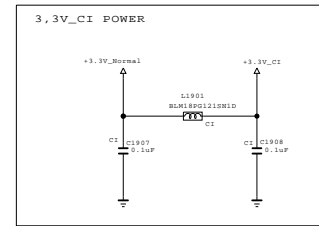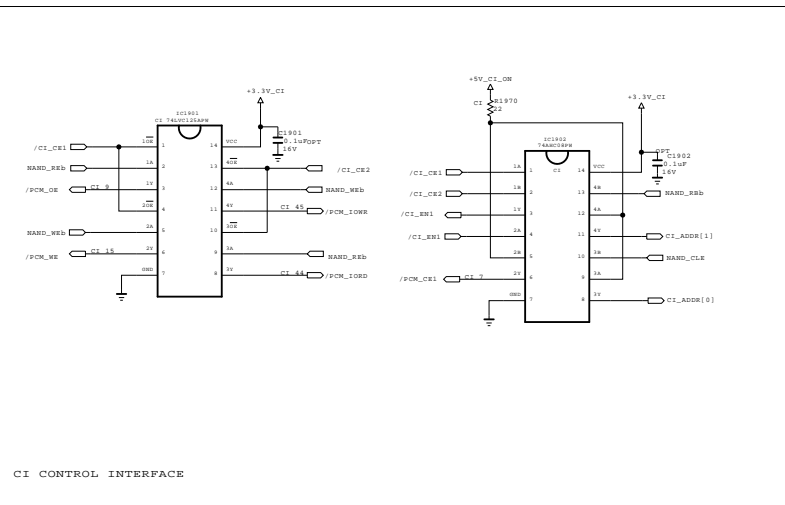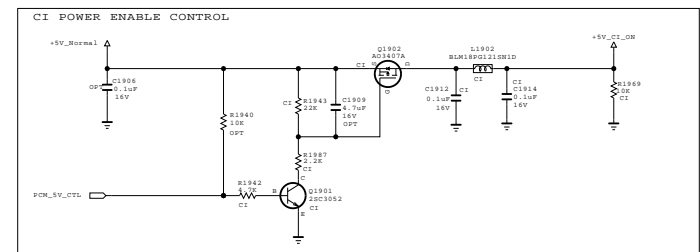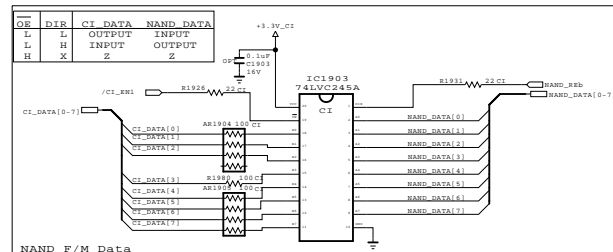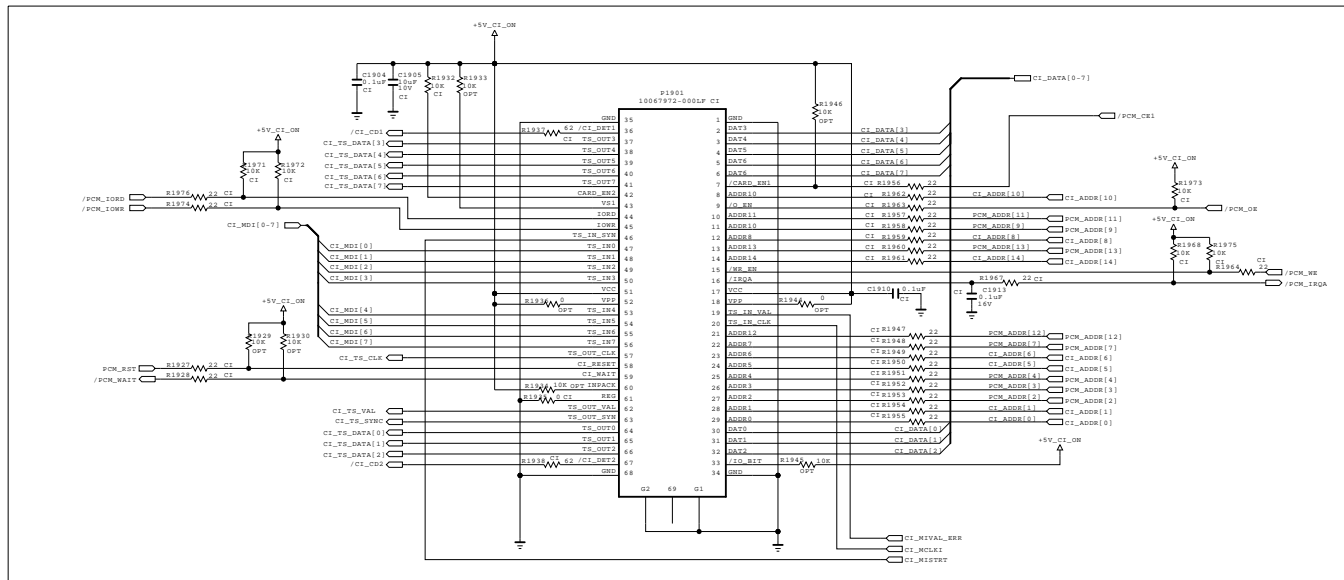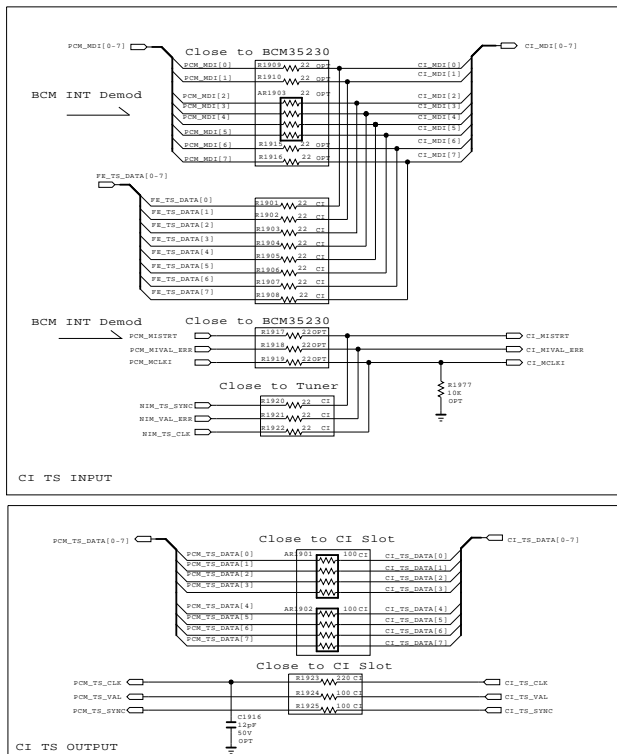
Close to BCM35230

BCM INT Demod

Close to BCM35230

BCM INT Demod

Close to Tuner

CI TS INPUT

Close to CI Slot

Close to CI Slot

CI TS OUTPUT

CI CONTROL INTERFACE

OE	DIR	CI DATA	NAND DATA
L	L	OUTPUT	INPUT
L	H	INPUT	INPUT
H	X	Z	Z

IC1903
74LVC245A

NAND F/M Data

IC1905
74LVC245A

P1901
10067972-000LF CI

CI POWER ENABLE CONTROL

Q1902
AO3407A

L1902
BLM18PG121SN1D

3,3V_CI POWER

+3.3V_Normal

L1901
BLM18PG121SN1D

CI DETECT

MODEL	BCM35230	DATE	2010.11.11
BLOCK	CI	SHEET	19 / 58

DVB-S2 LNB Part Allegro

(Option:LNB)

D2301
LNB SMAB34
40V

2A

D2304
SMAB34
40V
LNB

3A

C2307
0.01uF
50V
LNB

C2302
1uF
50V
LNB

C2324
68uF
35V
LNB

C2305
68uF
35V
LNB

close to Boost pin(#1)

DCDC_GND

+12V_LNB

LNB
L2301
33UH
SP-7850_33
2.4A

DCDC_GND

C2311
10uF
25V
LNB

C2312
0.1uF
50V
LNB

close to VIN pin(#25)
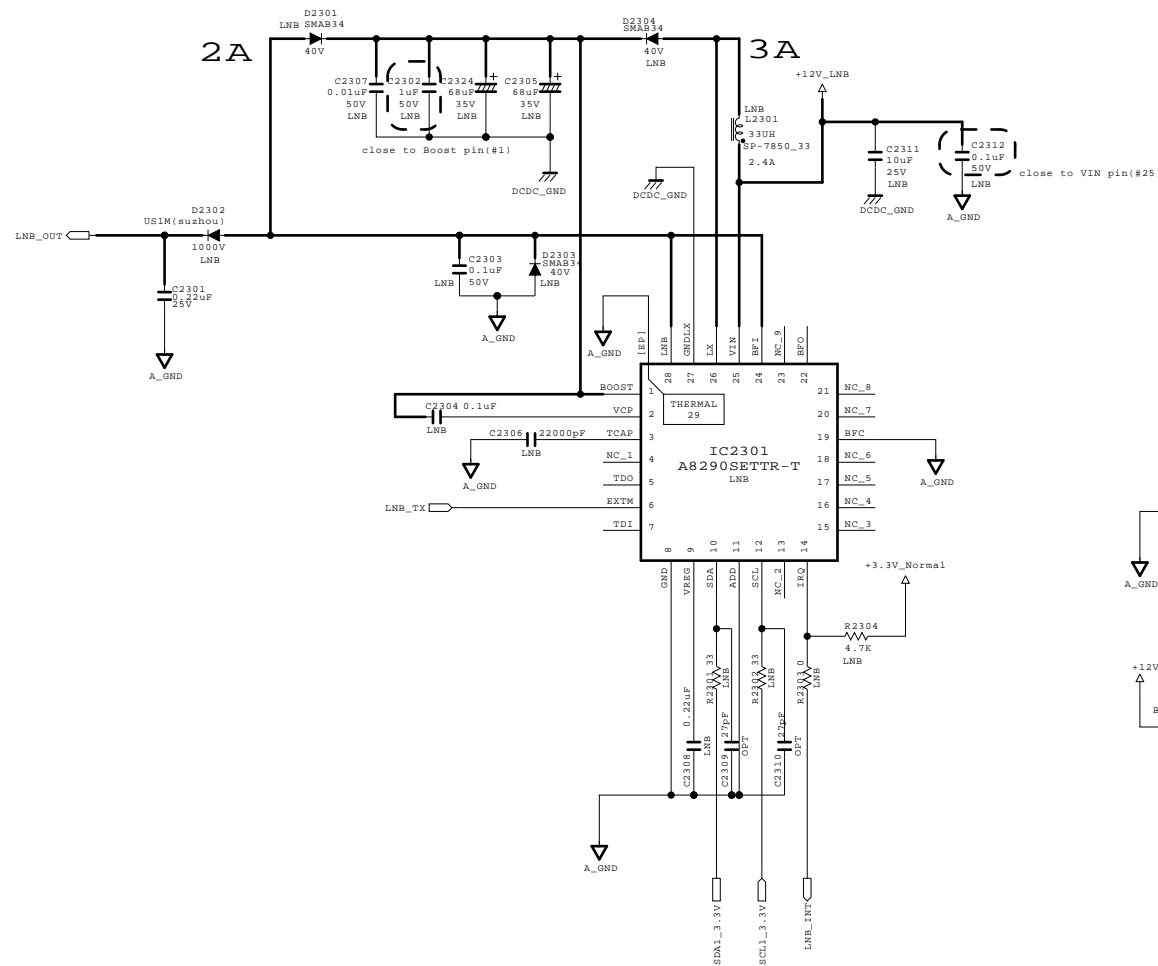
DCDC_GND

A_GND

DCDC_GND and A_GND are connected
DCDC_GND and A_GND are connected in pin#27
PCB_GND and A_GND are connected

Input trace widths should be sized to conduct at least 3A

Ouput trace widths should be sized to conduct at least 2A
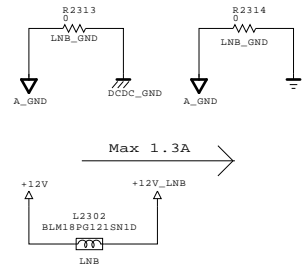
LNB_OUT

D2302
US1M(suzhou)
1000V
LNB

C2301
0.22uF
25V

A_GND

C2303
0.1uF
50V
LNB

D2303
SMAB34
40V
LNB

A_GND

A_GND

[RP]

A_GND

LNB
GNDLX
LX
VIN
BFI
NC_9
BFO

C2304 0.1uF
LNB

BOOST   1   28   27   26   25   24   23   22

VCP   2

THERMAL
29

21   NC_8

C2306 22000pF
LNB

TCAP   3

20   NC_7

A_GND

NC_1   4

IC2301
A8290SETTR-T
LNB

19   BFC

LNB_TX

TDO   5

18   NC_6

A_GND

EXTM   6

17   NC_5

TDI   7

16   NC_4

         8   9   10   11   12   13   14

15   NC_3

GND
VREG
SDA
ADD
SCL
NC_2
IRQ

+3.3V_Normal

R2304
4.7K
LNB

R2313
0
LNB_GND

R2314
0
LNB_GND

A_GND

DCDC_GND

A_GND

C2308 0.22uF
LNB

R2301 33
LNB

C2309 27pF
OPT

R2302 33
LNB

C2310 27pF
OPT

R2303 0
LNB

A_GND

Max 1.3A

+12V

+12V_LNB

L2302
BLM18PG121SN1D
LNB

SDA1_3.3V

SCL1_3.3V

LNB_INT

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

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LG ELECTRONICS

MODEL	BCM35230	DATE	2010.11.02
BLOCK	LNB	SHEET	23 / 57

NON CHB
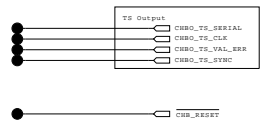
TS Output

CHBO_TS_SERIAL
CHBO_TS_CLK
CHBO_TS_VAL_ERE
CHBO_TS_SYNC

CHB_RESET

SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	NON CHB	SHEET	28 / 50

DUAL COMPONENT

D3716	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A	
IC3702	1ST : EAN60991801, 2ND : T-AZ1117BH_1.8, 3RD : EAN54428201	

* HDMI CEC

+3.5V_ST

+3.3V_Normal   +3.3V_HDMI

HDMI1

HDMI2

HDMI3

EDID Pull-up
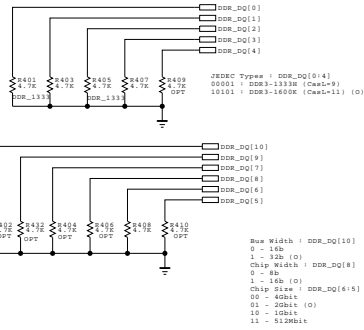
HDMI S/W OUTPUT

IC3701
SII9287B

THERMAL
73

ARC

THE ⚠ SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES
SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION.
FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS
ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR
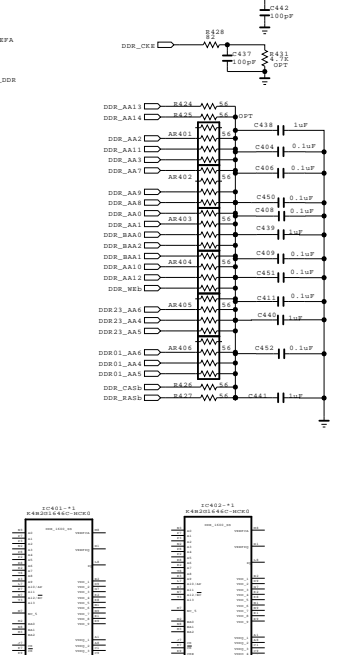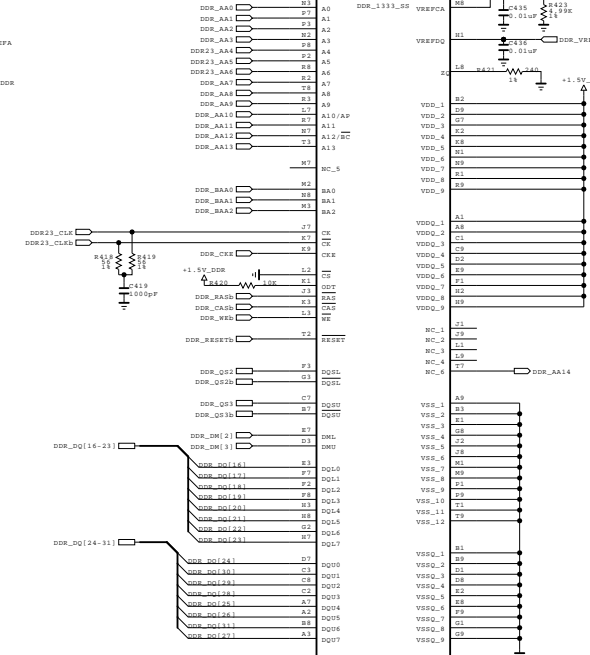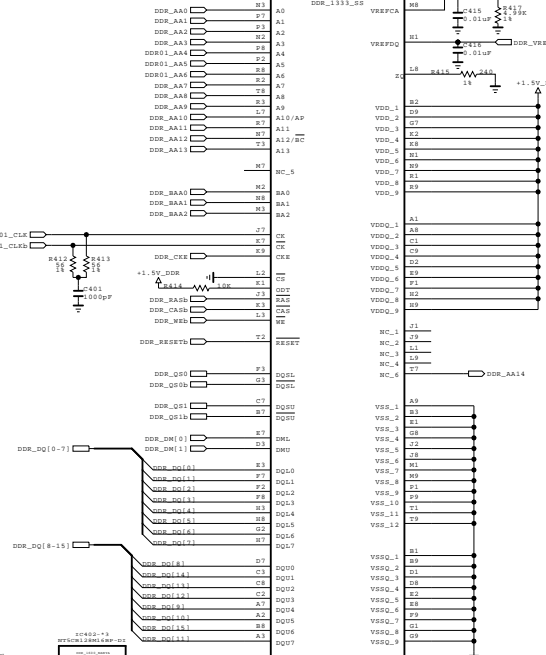THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMATIC.
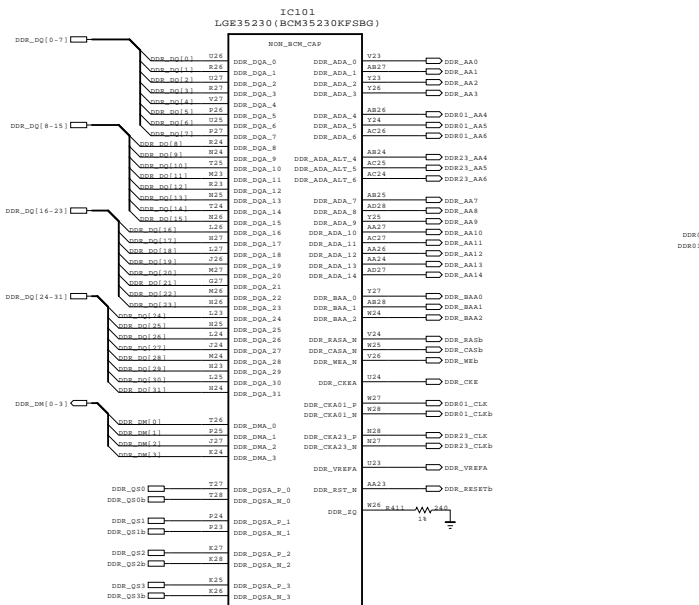
SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 HDMI	SHEET	37 / 50
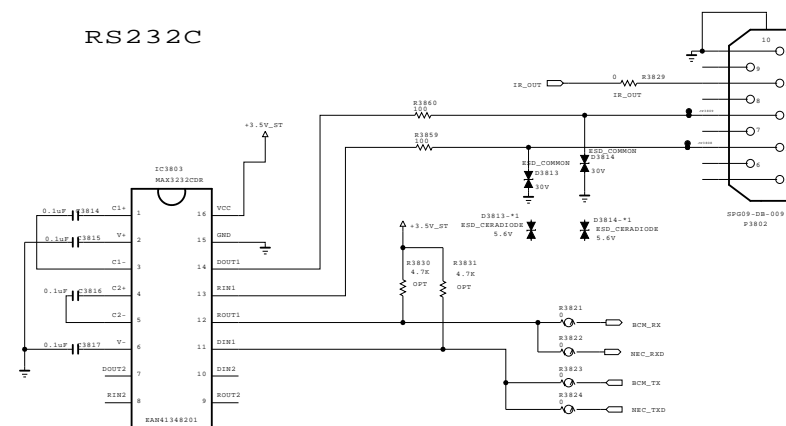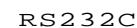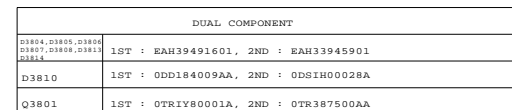
RGB/ PC AUDIO/ SPDIF/ EARPHONE/ RS232C

RGB PC

EARPHON JACK

DUAL COMPONENT		
D3804,D3805,D3806 D3807,D3808,D3813 D3814	1ST : EAH39491601, 2ND : EAH33945901	
D3810	1ST : 0DD184009AA, 2ND : 0DSIH00028A	
Q3801	1ST : 0TRIY80001A, 2ND : 0TR387500AA	

EARPHONE AMP

PC AUDIO

RS232C

SPDIF OUT

HIGH : SELECT X1, Y1, SELECT MAIN TX/RX
LOW : SELECT X0, Y0, SELECT MICOM TX/RX

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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 COMM JACK	SHEET	38 / 50

Ethernet Block
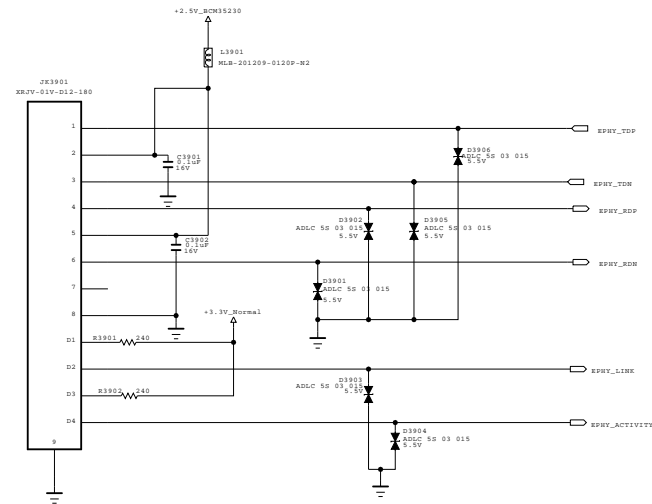
SECRET

LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 ETHERNET	SHEET	39 / 50

COMP/AV JACK PACK

SECRET
LGElectronics

🄛 LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU COMP/AV	SHEET	40 / 50

DUAL COMPONENT	
D4101,D4102	1ST : EAH42720601 2ND : EAH60994401

USB

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU USB	SHEET	41 / 50

3D_SYNC_RF

[FHD120Hz LVDS output(51pin+41Pin)]

P4201
FI-RE51S-HF-J-R1500

P4202
FI-RE41S-HF-J-R1500

R4205 33 FRC2   3D_SYNC_RF   LVDS_SEL

R4206 33 FRC2   SDA2_3.3V
R4207 33 FRC2   SCL2_3.3V
R4208 33 FRC2   FRC_RESET

+3.3V_Normal
R4212
3.3K
LVDS_SEL_HIGH
R4213
10K
LVDS_SEL_LOW

TXA0N
TXA0P
TXA1N
TXA1P
TXA2N
TXA2P

TXACLKN
TXACLKP

TXA3N
TXA3P
R4214 0   TXA4N
R4215 0   TXA4P
LVDS_10bit

TXC0N
TXC0P
TXC1N
TXC1P
TXC2N
TXC2P

TXCCLKN
TXCCLKP

TXC3N
TXC3P
TXC4N
TXC4P

TXD0N
TXD0P
TXD1N
TXD1P
TXD2N
TXD2P

TXDCLKN
TXDCLKP

TXD3N
TXD3P
TXD4N
TXD4P

BIT_SEL
R4211
10K
BIT_SEL_LOW

TXB0N
TXB0P
TXB1N
TXB1P
TXB2N
TXB2P

TXBCLKN
TXBCLKP

TXB3N
LVDS_10bit   TXB3P
R4216 0   TXB4N
R4217 0   TXB4P
LVDS_10bit

PANEL_VCC

L4201
WLB-201209-0120P-N2

C4201   C4202   C4203
10uF   1000p   0.1uF
25V   50V   50V
OPT

SECRET
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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU LVDS	SHEET	42 / 50

H/NIM & F/NIM & T/C/S2 Combo Tuner

ERROR & VALID PIN

<EU, China>

Tuner to CI Slot

Option Table

H/NIM (EU)	F/NIM T/C	DVB-T/C/S2 (Eu,Aisa)
Non_S	Non_S	S
H/NIM	F/NIM	
SCART	SCART	SCART
BOOSTER	BOOSTER EU_BR_F/NIM RF_SW_CTL1 EU_F/NIM	

Non_S: not use DVB-T/C/S2 combo Tuner(use H/NIM and F/NIM)
S : use DVB-T/C/S2 combo Tuner
H/NIM: use H/NIM(H/NIM, DVB-T/C/S2 combo Tuner)
F/NIM: use F/NIM(EU_T/C, EU_DVB-T2, China)
SCART: use Scart Jack
CN : use China F/NIM
BOOSTER: use BOOSTER_CTL
RF_SW_CTL1 use RF_SWITCH_CTL
TC_F/NIM: use EU_DVB-T/C F/NIM
T2_CN_F/NIM_BR: use EU_DVB-T2, China F/NIM, BRZIL F/NIM
EU_F/NIM: use EU_F/NIM
EU_BR_F/NIM: use EU_F/NIM and Brazil F/NIM

* DVB-T/C/S2 combo Tuner: DVB-T/C is H/NIM, and DVB-S2 is F/NIM

DUAL COMPONENT

IC4401	1ST : T-TJ3940S_XX, 2ND : T-AP2114H_2.5TRG1

TU4401 TDFR-G136D
TU4402 TDFQ-G001D

HORIZONTAL_T

1	NC_1
2	BST_CNTL
3	+B1[5V]
4	NC_2[RF_AGC]
5	NC_3
6	SCLT
7	SDAT
8	NC_4
9	SIF
10	NC_5
11	VIDEO
12	GND
13	+B2[1.2V]
14	+B3[3.3V]
15	RESET
16	+B4[2.5V]
17	SCL
18	SDA
19	ERR
20	SYNC
21	VALID
22	MCL
23	D0
24	D1
25	D2
26	D3
27	D4
28	D5
29	D6
30	D7
31	SHIELD

HORIZONTAL_S

1	NC_1
2	NC_2
3	NC_3
4	S2_TU[3.3V]
5	NC_4
6	TU_SCL
7	TU_SDA
8	T_1.8V
9	T_SIF
10	NC_5
11	T_CVBS
12	GND_1
13	TD_1.2V
14	T_3.3
15	T_TU_RESET
16	NC_6
17	TD_SCL
18	TD_SDA
19	T/C/S2_ERROR
20	T/C/S2_SYNC
21	T/C/S2_VALID
22	T/C/S2_MCL
23	T/C/S2_D0
24	T/C/S2_D1
25	T/C/S2_D2
26	T/C/S2_D3
27	T/C/S2_D4
28	T/C/S2_D5
29	T/C/S2_D6
30	T/C/S2_D7
31	S2_1.25V
32	S2_RESET
33	S2_3.3V
34	S2_F22
35	S2_SCL
36	S2_SDA
37	GND_2
38	S2_LNB
39	SHIELD

IF_N
IF_P
IF_AGC
TU_RESET_SUB
RF_SWITCH_CTL_2
RF_SWITCH_CTL
TW9910_RESET

close to TUNER
BOOSTER
Q4401 MMBT3906(NXP)
Q4403 2SC3052
Q4402 4.7K MMBT3906(NXP)
Q4404 MMBT3906(NXP)
Q4405 MMBT3906(NXP)

IC4404 NL17SZ08DFT2G
HOME_T2

IC4403 AP2132MP-2.5TRG1 [RP]
2A
EAN61387601

Vout=0.6*(1+R1/R2)

IC4402 AS1117WH-1.8TRE1

IC4401 AP2114H-2.5TRG1

Max 1.5A
Max 217mA

AR4401 NON_S 47
AR4402 NON_S 47
AR4403 NON_S 47

FE_TS_DATA[0-7]
FE_TS_DATA[0]
FE_TS_DATA[1]
FE_TS_DATA[2]
FE_TS_DATA[3]
FE_TS_DATA[4]
FE_TS_DATA[5]
FE_TS_DATA[6]
FE_TS_DATA[7]

OPTION:SCART

Surge protection
Q4401 100MCJ20A(sushiasgrande)

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU TUNER	SHEET	44 / 50

DUAL COMPONENT	
Q4502,Q4503 Q4504,Q4506 Q4507,Q4508	1ST : 0TRIY80001A 2ND : 0TR387500AA
Q4501	1ST : EBK61012701, 2ND : EBK58172301
Q4505	1ST : 0TRIH80004A, 2ND : EBK61012501, 3RD : 0TR102009AM
D4513	1ST : T-BAT54_SUZHO, 2ND : 0DSON00138A
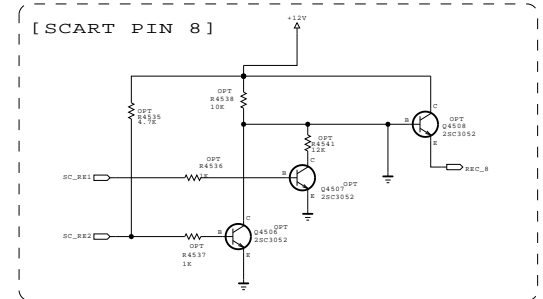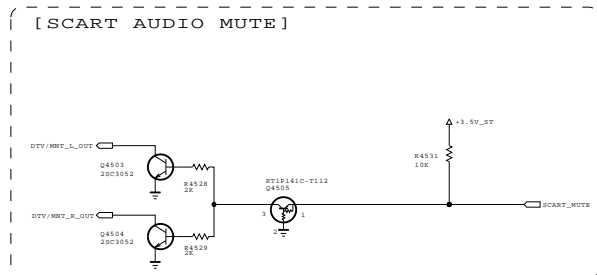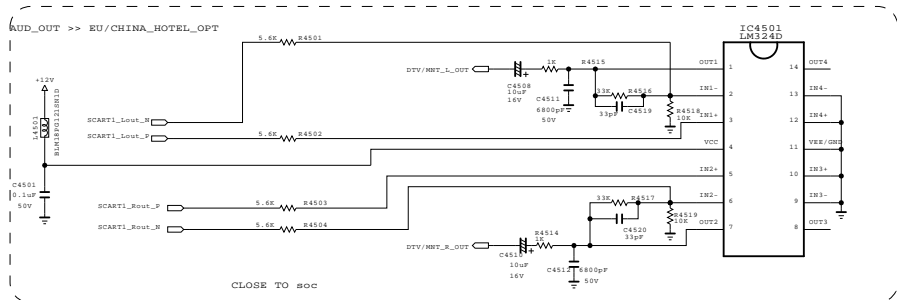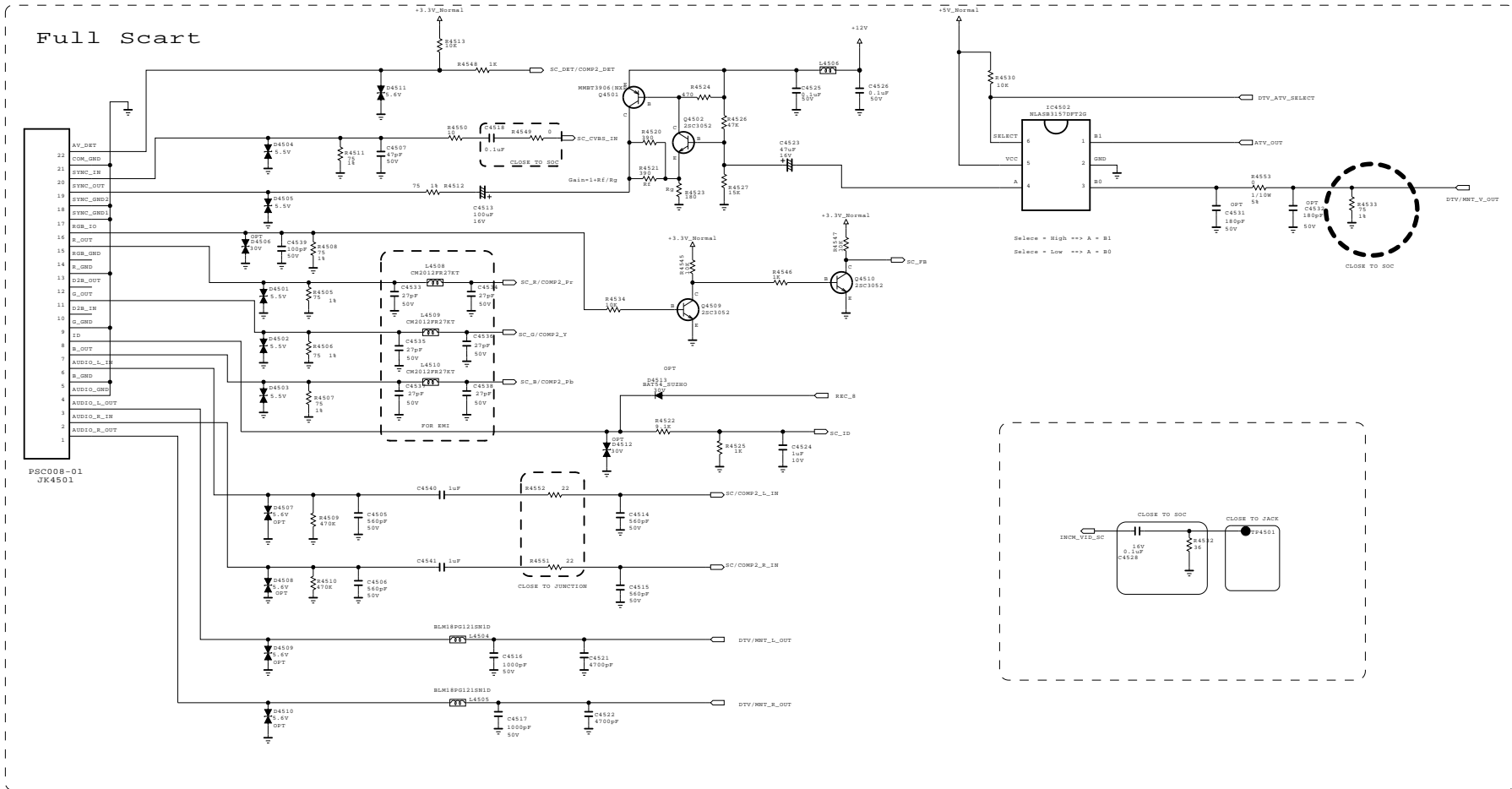
Full Scart

Gain=1+Rf/Rg

Selece = High ==> A = B1
Selece = Low ==> A = B0

CLOSE TO SOC

PSC008-01
JK4501

CLOSE TO SOC   CLOSE TO JACK

IC4501
LM324D

AUD_OUT >> EU/CHINA_HOTEL_OPT

CLOSE TO soc

[SCART AUDIO MUTE]

[SCART PIN 8]

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LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU SCART	SHEET	45 / 50

DUAL COMPONENT

Q4601	1ST : 0TRIY80001A 2ND : 0TR387500AA

IC4601
NTP-7400L

THERMAL 49

[EP]

Pin	Left
1	AGND_PLL
2	AVDD_PLL
3	DVDD_PLL
4	LF
5	DGND_PLL
6	GND_1
7	DGND
8	DVDD
9	SDATA
10	WCK
11	BCK
12	SDA

Top pins: 48 VDD_IO, 47 CLK_I, 46 GND_IO, 45 AD, 44 /RESET, 43 BST1A, 42 PGND1A, 41 OUT1A_2, 40 OUT1A_1, 39 PVDD1_3, 38 PVDD1_2, 37 PVDD1_1

Right pins: 36 OUT1B_2, 35 OUT1B_1, 34 PGND1B, 33 BST1B, 32 VDR1, 31 VCC_5, 30 GND_2, 29 VDR2, 28 BST2A, 27 PGND2A, 26 OUT2A_2, 25 OUT2A_1

Bottom pins: 13 SCL, 14 /FAULT, 15 MONITOR0, 16 MONITOR1, 17 MONITOR2, 18 BST2B, 19 PGND2B, 20 OUT2B_1, 21 OUT2B_2, 22 PVDD2_1, 23 PVDD2_2, 24 PVDD2_3

SPEAKER_L
SPEAKER_R

SPK_L+ SPK_L- SPK_R+ SPK_R-

WAFER-ANGLE
P4601

+24V
+24V_AMP
+3.3V_Normal
+3.5V_ST
AMP_RESET_N
AMP_MUTE
AUD_MASTER_CLK
AUD_LRCH
AUD_LRCK
AUD_SCK
SDA3_3.3V
SCL3_3.3V

Q4601 2SC3052
R4601 10K
R4602 10K
R4603 100
R4604 100
R4605 3.3K
R4606 100
R4607 OPT
R4608 1Ω R4609 1Ω R4610 1Ω R4611 1Ω R4612 1Ω R4613 1Ω R4614 1Ω R4615 1Ω
R4616 4.7K R4617 4.7K R4618 4.7K R4619 4.7K

L4601 MLB-201209-0120P-N2
L4602 BLM18PG121SN1D
L4603 10.0uH L4604 10.0uH L4605 10.0uH L4606 10.0uH

D4601 1N4148W 100V OPT
D4602 1N4148W 100V OPT
D4603 1N4148W 100V OPT
D4604 1N4148W 100V OPT

MODEL	BCM35230	DATE	
BLOCK	LV7 EU AMP	SHEET	46 / 50

DUAL COMPONENT	
D4703,D4704 D4705,D4706	1ST : EAH42720601, 2ND : EAH60994401
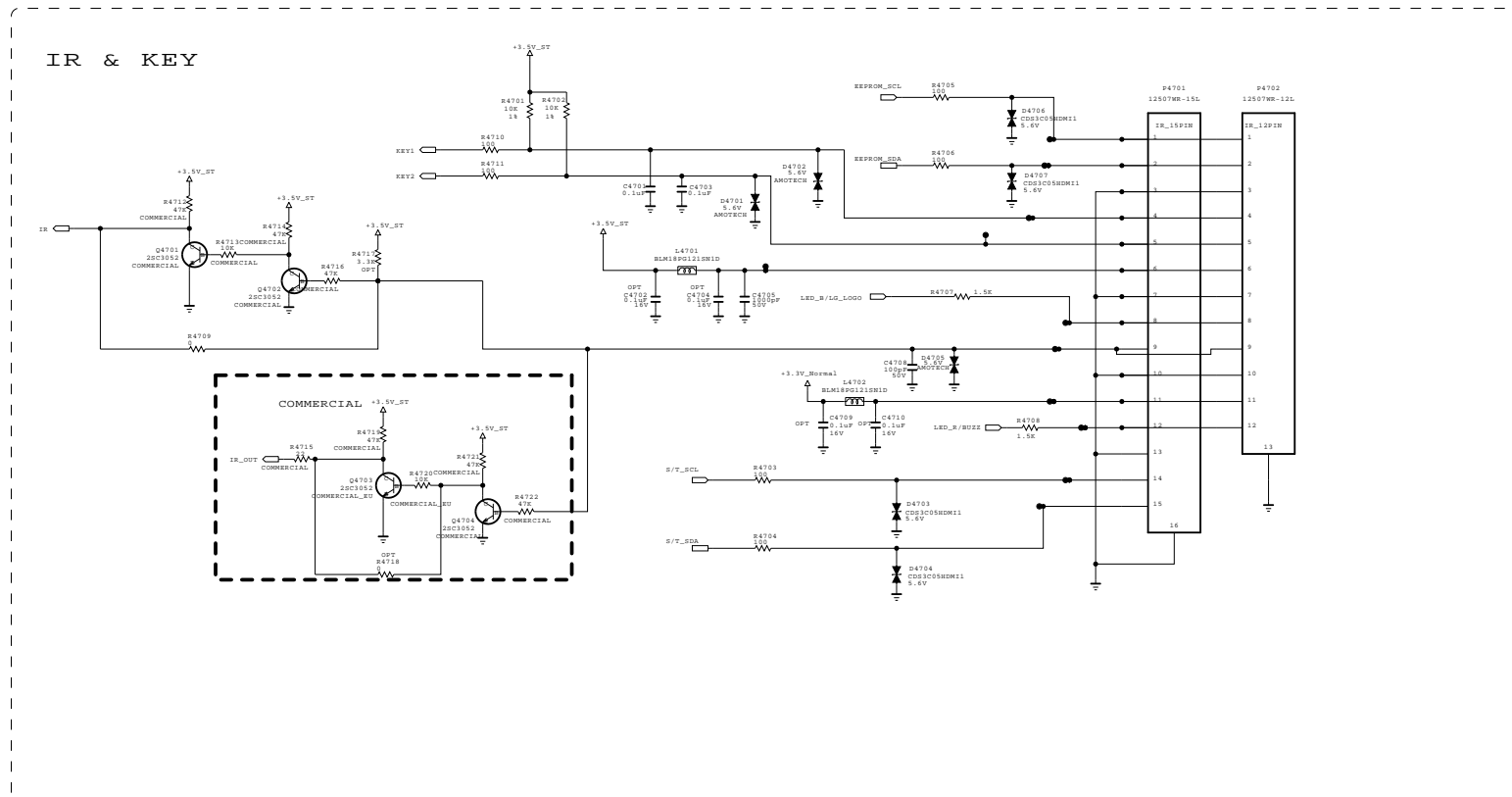
IR & KEY

+3.5V_ST

R4701 10K 1%
R4702 10K 1%

EEPROM_SCL R4705 100
D4706 CDS3C05HDMI1 5.6V

P4701 12507WR-15L
P4702 12507WR-12L

IR_15PIN
IR_12PIN

R4710 100
KEY1

R4711 100
KEY2

EEPROM_SDA R4706 100
D4707 CDS3C05HDMI1 5.6V

+3.5V_ST

R4712 47K
COMMERCIAL

IR

Q4701 2SC3052 COMMERCIAL

+3.5V_ST

R4714 47K

R4713 COMMERCIAL 10K

Q4702 2SC3052 COMMERCIAL

R4716 47K OPT

+3.5V_ST

R4717 3.3K OPT

C4701 0.1uF
C4703 0.1uF
D4701 5.6V AMOTECH
D4702 5.6V AMOTECH

+3.5V_ST

L4701 BLM18PG121SN1D

OPT C4702 0.1uF 16V
OPT C4704 0.1uF 16V
C4705 1000pF 50V

LED_R/LG_LOGO R4707 1.5K

R4709 0

C4706 100pF 50V
D4705 5.6V AMOTECH

+3.3V_Normal
L4702 BLM18PG121SN1D

COMMERCIAL
+3.5V_ST

R4719 47K COMMERCIAL

IR_OUT R4715 0 COMMERCIAL

Q4703 2SC3052 COMMERCIAL_EU

R4720 COMMERCIAL 10K

+3.5V_ST

R4721 47K COMMERCIAL

Q4704 2SC3052 COMMERCIAL

R4722 47K COMMERCIAL

OPT R4718

OPT C4709 0.1uF 16V
OPT C4710 0.1uF 16V

LED_R/BUZZ R4708 1.5K

S/T_SCL R4703 100

D4703 5.6V CDS3C05HDMI1

S/T_SDA R4704 100

D4704 CDS3C05HDMI1 5.6V

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SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	
BLOCK	LV7 EU IR	SHEET	47 / 50
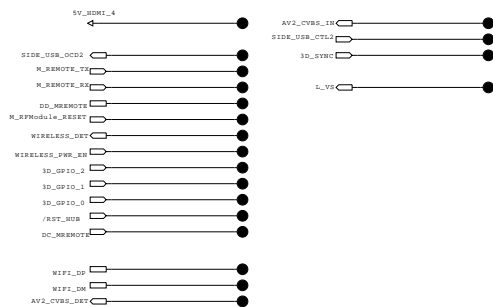
5V_HDMI_4

AV2_CVBS_IN
SIDE_USB_CTL2
3D_SYNC

SIDE_USB_OCD2
M_REMOTE_TX
M_REMOTE_RX

L_VS

DD_MREMOTK
M_RFModule_RESET
WIRELESS_DET
WIRELESS_PWR_EN
3D_GPIO_2
3D_GPIO_1
3D_GPIO_0
/RST_HUB
DC_MREMOTK

WIFI_DP
WIFI_DM
AV2_CVBS_DET

SECRET		LG ELECTRONICS
LGElectronics		

MODEL	BCM35230	DATE	
BLOCK	LV7 EU	SHEET	48 / 50

SMD GASKET

SMD GASKET 4.5T

M1 MDS62110208 GASKET_4.5T · M2 MDS62110208 GASKET_4.5T · M3 MDS62110208 GASKET_4.5T · M4 MDS62110208 GASKET_4.5T · M5 MDS62110208 GASKET_4.5T · M6 MDS62110208 GASKET_4.5T · M7 MDS62110208 GASKET_4.5T · M8 MDS62110208 GASKET_4.5T · M9 MDS62110208 GASKET_4.5T · M10 MDS62110208 GASKET_4.5T · M11 MDS62110208 GASKET_4.5T · M12 MDS62110208 GASKET_4.5T

SMD GASKET 7.5T

M1-*4 MDS62110205 GASKET_7.5T · M2-*4 MDS62110205 GASKET_7.5T · M3-*4 MDS62110205 GASKET_7.5T · M4-*4 MDS62110205 GASKET_7.5T · M5-*4 MDS62110205 GASKET_7.5T · M6-*4 MDS62110205 GASKET_7.5T · M7-*4 MDS62110205 GASKET_7.5T · M8-*4 MDS62110205 GASKET_7.5T · M9-*4 MDS62110205 GASKET_7.5T · M10-*4 MDS62110205 GASKET_7.5T · M11-*4 MDS62110205 GASKET_7.5T · M12-*4 MDS62110205 GASKET_7.5T

SMD GASKET 5.0T

M1-*1 MDS62110210 GASKET_5.0T · M2-*1 MDS62110210 GASKET_5.0T · M3-*1 MDS62110210 GASKET_5.0T · M4-*1 MDS62110210 GASKET_5.0T · M5-*1 MDS62110210 GASKET_5.0T · M6-*1 MDS62110210 GASKET_5.0T · M7-*1 MDS62110210 GASKET_5.0T · M8-*1 MDS62110210 GASKET_5.0T · M9-*1 MDS62110210 GASKET_5.0T · M10-*1 MDS62110210 GASKET_5.0T · M11-*1 MDS62110210 GASKET_5.0T · M12-*1 MDS62110210 GASKET_5.0T

SMD GASKET 8.5T

M1-*5 MDS62110209 GASKET_8.5T · M2-*5 MDS62110209 GASKET_8.5T · M3-*5 MDS62110209 GASKET_8.5T · M4-*5 MDS62110209 GASKET_8.5T · M5-*5 MDS62110209 GASKET_8.5T · M6-*5 MDS62110209 GASKET_8.5T · M7-*5 MDS62110209 GASKET_8.5T · M8-*5 MDS62110209 GASKET_8.5T · M9-*5 MDS62110209 GASKET_8.5T · M10-*5 MDS62110209 GASKET_8.5T · M11-*5 MDS62110209 GASKET_8.5T · M12-*5 MDS62110209 GASKET_8.5T

SMD GASKET 5.5T

M1-*2 MDS62110204 GASKET_5.5T · M2-*2 MDS62110204 GASKET_5.5T · M3-*2 MDS62110204 GASKET_5.5T · M4-*2 MDS62110204 GASKET_5.5T · M5-*2 MDS62110204 GASKET_5.5T · M6-*2 MDS62110204 GASKET_5.5T · M7-*2 MDS62110204 GASKET_5.5T · M8-*2 MDS62110204 GASKET_5.5T · M9-*2 MDS62110204 GASKET_5.5T · M10-*2 MDS62110204 GASKET_5.5T · M11-*2 MDS62110204 GASKET_5.5T · M12-*2 MDS62110204 GASKET_5.5T

SMD GASKET 9.5T

M1-*6 MDS61887210 GASKET_9.5T · M2-*6 MDS61887210 GASKET_9.5T · M3-*6 MDS61887210 GASKET_9.5T · M4-*6 MDS61887210 GASKET_9.5T · M5-*6 MDS61887210 GASKET_9.5T · M6-*6 MDS61887210 GASKET_9.5T · M7-*6 MDS61887210 GASKET_9.5T · M8-*6 MDS61887210 GASKET_9.5T · M9-*6 MDS61887210 GASKET_9.5T · M10-*6 MDS61887210 GASKET_9.5T · M11-*6 MDS61887210 GASKET_9.5T · M12-*6 MDS61887210 GASKET_9.5T

SMD GASKET 6.5T

M1-*3 MDS62110206 GASKET_6.5T · M2-*3 MDS62110206 GASKET_6.5T · M3-*3 MDS62110206 GASKET_6.5T · M4-*3 MDS62110206 GASKET_6.5T · M5-*3 MDS62110206 GASKET_6.5T · M6-*3 MDS62110206 GASKET_6.5T · M7-*3 MDS62110206 GASKET_6.5T · M8-*3 MDS62110206 GASKET_6.5T · M9-*3 MDS62110206 GASKET_6.5T · M10-*3 MDS62110206 GASKET_6.5T · M11-*3 MDS62110206 GASKET_6.5T · M12-*3 MDS62110206 GASKET_6.5T

GASKET3.5T_HEATSINK M20 MDS62110213 · GASKET3.5T_HEATSINK M21 MDS62110213 · GASKET3.5T_HEATSINK M22 MDS62110213 · GASKET3.5T_HEATSINK M23 MDS61887210

SECRET
LGElectronics

LG ELECTRONICS

MODEL	BCM35230	DATE	2010. 09. 18
BLOCK	SMD GASKET	SHEET	56 / 56

Electronic Product Standard Repair Process

LCD TV

Contents of LCD TV Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Video error, video lag/stop, fail tunning	3, 4	
4		Color error	5	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	6	
6	B. Power error	No power	7	
7		Off when on, off while viewing, power auto on/off	8	
8	C. Audio error	No audio/Normal video	9	
9		Wrecked audio/discontinuation/noise	10	
10	D. Function error	No response in remote controller, key error, recording error, memory error	11	
11		External device recognition error	12	
12	E. Noise	Circuit noise, mechanical noise	13	
13	F. Exterior error	Exterior defect	14	

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		No video/ Normal audio	Revised date		1/14

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable,,,)

☞A1

☞A4

No video Normal audio → Normal audio

Y → Check Back Light On with naked eye → On

Y → Check Power Board 12v,3.5v etc. → Normal voltage

Y → Replace T-con Board or module And Adjust VCOM

N → Move to No video/No audio

N → ☞A2 Check Power Board 24v output

N → Repair Power Board or parts

☞A28

Normal voltage

Y → Replace Inverter or module → End

N → Repair Power Board or parts

※Precaution ☞A7 & A3

Always check & record S/W Version and White Balance value before replacing the Main Board → Replace Main Board → Re-enter White Balance value

1

LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		No video/ No audio	Revised date		2/14

☞**A4**

No Video/ No audio → **Check various voltages of Power Board (3.5V,12V,20V or 24V…)** → **Normal voltage?**

Normal voltage? — Y → Check and replace MAIN B/D → End

Normal voltage? — N → Replace Power Board and repair parts → End

2

LCD TV	Error symptom	**A. Picture Problem**		**Established date**	**2010. 12 .14**	
		Picture broken/ Freezing		**Revised date**		**3/14**

☞ **A6**

Check RF Signal level

. By using Digital signal level meter
. By using Diagnostics menu on OSD
  (Menu→ Set up→ Support → Signal Test)
  - Signal strength (Normal : over 50%)
  - Signal Quality (Normal: over 50%)

Normal Signal? — Y → **Check whether other equipments have problem or not.**
(By connecting RF Cable at other equipment)
→ DVD Player ,Set-Top-Box, Different maker TV etc`

N

Check RF Cable Connection
1. Reconnection
2. Install Booster

Normal Picture? — Y → ☞ **A7**

■ Menu→Setup →Booster

Check S/W Version → **SVC Bulletin?** — N → **Booster menu**
On→Off: Check
Off→On: Check → **Normal Picture?** — Y → **Close**

N ↓

Normal Picture? — N → **Contact with signal distributor or broadcaster (Cable or Air)**

SVC Bulletin? — Y ↓

S/W Upgrade

Normal Picture? — N →

Normal Picture? — Y → **Close**

Normal Picture? — N → **Check Tuner soldering** → **Replace Main B/D**

Normal Picture? — Y → **Close**

3

LCD TV	Error symptom	A. Picture Problem (DVB-S/S2)	Established date	2011. 01 .24	
		Tuning fail, Picture broken/ Freezing	Revised date		4/14

☞ **A6**

Check RF Signal level

Check RF signal cable (DVB satellite signal or not)
Check whether other equipments have problem or not.
(By connecting RF Cable at other equipment)
→ Set-Top-Box, Different maker TV etc

Normal Signal?

Y → Check satellite setting.
- **Check LNB frequency.**
- **Check satellite**
- **Check Satellite connection (DiSEqC, motor, etc…)**

N → **Contact with signal distributor or broadcaster (Cable or Air)** → **Close**

Normal setting?

Y → ☞ **A7** **Check S/W Version**

N → **Change satellite setting (match with installed ANT)**

Normal Picture?

N → (to Check S/W Version)

Y → **Close**

SVC Bulletin?

N → **Check Tuner soldering** → **Replace Main B/D**

Y → **S/W Upgrade**

Normal Picture?

N → (to Check Tuner soldering)

Y → **Close**

4

LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		Color error	Revised date		5/14

☞**A8**

Check color by input
-External Input
-COMPONENT
-RGB
-HDMI/DVI

☞ **A10/ A11**

※ Check and replace Link Cable (LVDS) and contact condition

Color error? — Y →

Color error? — Y → Replace Main B/D → **Color error?** — Y → Replace module

N → Check error color input mode

N →

N → **End**

☞**A12**

Check Test pattern

External Input/Component error → Check external device and cable → **External device/Cable normal** — Y → Replace Main B/D

N → **Request repair for external device/cable**

RGB/ HDMI/DVI error → Check external device and cable → **External device/Cable normal** — Y → Replace Main B/D

N →

5

LCD TV	Error symptom	A. Video error	Established date	2010. 12 .14	
		Vertical / Horizontal bar, residual image, light spot, external device color error	Revised date		6/14

Vertical/Horizontal bar, residual image, light spot

☞**A8**

Check color condition by input
-External Input
-Component
-RGB
-HDMI/DVI

☞**A12**
Check Test pattern

Screen normal?
- Y → Check external device connection condition
- N → Replace module

Normal?
- Y → ☞ **A10/ A11** Check and replace Link Cable
- N → Request repair for external device

Screen normal?
- N → ☞ **A28** Replace Main B/D (adjust VCOM) **For LGD panel** / Replace Main B/D **For other panel**
- Y → End

Screen normal?
- N → Replace Module
- Y → End

External device screen error-Color error

Check S/W Version → **Check version**
- N → Check screen condition by input
  -External Input
  -Component
  -RGB
  -HDMI/DVI
- Y → S/W Upgrade → **Normal screen?**
  - N → (back to Check screen condition)
  - Y → End

External Input error
Component error → Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator ,Set-top Box etc.)
- **Screen normal?**
  - N → Replace Main B/D
  - Y → Request repair for external device

RGB error
HDMI/DVI → Connect other external device and cable (Check normal operation of External Input, Component, RGB and HDMI/DVI by connecting Jig, pattern Generator ,Set-top Box etc.)
- **Screen normal?**
  - N → Replace Main B/D
  - Y → Request repair for external device

6

LCD TV	**Error symptom**	**B. Power error**		**Established date**	**2010. 12 .14**	
		No power		**Revised date**		**7/14**

☞**A17**

Check Power LED

. Stand-By: Red
. Operating: white

Power LED On?

Y → DC Power on by pressing Power Key On Remote control → **Normal operation?**

N → **Check Power cord was inserted properly**

Normal?

N → **Check ST-BY 3.5V** ☞**A18**

Y → **Close**

Normal voltage?

Y → (up to DC Power on)

N → Replace Power B/D

☞**A4**

Measure voltage of each output of Power B/D

Normal voltage?

Y → Replace Main B/D

N → Replace Power B/D

☞**A19**

Check Power On '"High"

OK?

Y → Replace Power B/D.

N → Replace Main B/D

7

LCD TV	**Error symptom**	**B. Power error**		**Established date**	**2010. 12 .14**	
		Off when on, off while viewing, power auto on/off		**Revised date**		**8/14**

Check outlet

Check A/C cord

Check for all 3- phase power out

Error?

N → ☞**A22** **Check Power Off Mode**

Y → Fix A/C cord & Outlet and check each 3 phase out

CPU Abnormal

Abnormal 1

Replace Main B/D → Normal? → Y → **End**

N → Replace Power B/D

☞**A19**

(If Power Off mode is not displayed) Check Power B/D voltage

Normal voltage? → Y → Replace Main B/D

N → Replace Power B/D

※ Caution
Check and fix exterior of Power B/D Part

* **Please refer to the all cases which
     can be displayed on power off mode.**

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reserved Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	**"POWEROFF_ABNORMAL1"**	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

8

LCD TV	Error symptom	C. Audio error	Established date	2010. 12 .14	
		No audio/ Normal video	Revised date		9/14

☞**A24**

☞**A25**

No audio
Screen normal

Check user menu > Speaker off

Off

N

Check audio B+ 24V of Power Board

Normal voltage

Y

Y

Cancel OFF

N

Replace Power Board and repair parts

Check Speaker disconnection

Disconnection

N

Replace MAIN Board

End

Y

Replace Speaker

9

LCD TV	Error symptom	C. Audio error	Established date	2010. 12 .14	
		Wrecked audio/ discontinuation/noise	Revised date		10/14

→ abnormal audio/discontinuation/noise is same after "Check input signal" compared to No audio

☞**A25**

Check input signal
-RF
-External Input signal

Signal normal? — Y / N

(When RF signal is not received) Request repair to external cable/ANT provider

(In case of External Input signal error) Check and fix external device

Wrecked audio/ Discontinuation/ Noise for all audio → Check and replace speaker and connector → Check audio B+ Voltage (24V)

Wrecked audio/ Discontinuation/ Noise only for D-TV → Replace Main B/D

Wrecked audio/ Discontinuation/ Noise only for Analog → Replace Power B/D

Wrecked audio/ Discontinuation/ Noise only for External Input → Connect and check other external device → Normal audio? N / Y

Normal voltage? Y / N

Replace Power B/D

Replace Main B/D → End

Check and fix external device

10

| **LCD TV** | **Error symptom** | **D. General Function Problem** | **Established date** | **2010. 12 .14** | |
| | | **Remote control & Local switch checking** | **Revised date** | | **11/14** |

1. Remote control (R/C) operating error

```
Check R/C itself          Normal        Y      ☞A27              Normal      N    ☞A27          Normal     Y    ☞A27         Normal        Y    Replace
Operation                operating?  ───►  Check & Repair     operating?  ───► Check B+    Voltage?  ───► Check IR     Signal?   ───► Main B/D
                                           Cable connection                    3.5V                      Output signal
                              │            Connector solder         │          On Main B/D       │                         │
                              │ N                                   │ Y                           │ N                       │ N
                              ▼                                     ▼                             ▼                         ▼
```

Check R/C Operating When turn off light in room

Check & Replace Battery of R/C

Close

☞A4

Check 3.5v on Power B/D Replace Power B/D or Replace Main B/D (Power B/D don't have problem)

Repair/Replace IR B/D

Normal operating? ──► **Close**

If R/C operate, Explain the customer cause is interference from light in room.

N

Replace R/C

11

LCD TV	Error symptom	**D. Function error**	**Established date**	**2010. 12 .14**	
		External device recognition error	**Revised date**		**12/14**

```
┌──────────┐        ◇              ┌──────────────────┐         ◇                    ◇                    ┌────────────────────┐
│ Check    │   Y  Signal     Y    │ Check technical  │    N  Technical       N  External Input          │ Replace Main B/D   │
│ input    │─────▶ input?  ───────▶│ information      │──────▶ information?  ──────▶ And Component  ─────▶│                    │
│ signal   │        ◇              │ - Fix information│         ◇                    Recognition error    └────────────────────┘
└──────────┘        │ N            │ - S/W Version    │         │ Y
                    ▼              └──────────────────┘         ▼
            ┌──────────────────┐                          ◯ Fix in                   ◇                    ┌────────────────────┐
            │ Check and fix    │                            accordance                 RGB,              │ Replace Main B/D   │
            │ external device/ │                            with technical             HDMI/DVI Optical ─▶│                    │
            │ cable            │                            information                 Recognition       └────────────────────┘
            └──────────────────┘                                                        error
```

Check input signal → Signal input? — Y → Check technical information - Fix information - S/W Version → Technical information? — N → External Input And Component Recognition error → Replace Main B/D

Signal input? — N → Check and fix external device/cable

Technical information? — Y → Fix in accordance with technical information

RGB, HDMI/DVI Optical Recognition error → Replace Main B/D

12

LCD TV	Error symptom	**E. Noise**	**Established date**	**2010. 12 .14**	
		Circuit noise, mechanical noise	**Revised date**		**13/14**

Identify nose type

Circuit noise

Check location of noise

OR

Replace PSU (with LED driver)

Replace LED driver

Mechanical noise

Check location of noise

※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in "Part related to nose" in the Owner's Manual.

OR

※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)

※ If there is a "Tak Tak" noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)

13

LCD TV	Error symptom	F. Exterior defect	Established date	2010. 12 .14	
		Exterior defect	Revised date		14/14

Zoom part with exterior damage

Module damage → Replace module → **Adjust VCOM** ☞**A28**

Cabinet damage → Replace cabinet

Remote controller damage → Replace remote controller

Stand dent → Replace stand

14